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ABSTRACT

This book examines the capacity of the career academy--one of the initiatives spawned by the school-to-work movement--to address academic reform in terms of increased education and workplace skills. Qualitative data collected as part of a 7-year local evaluation of career academies and a data set that contains transcript data on a population of three cohorts of public high school students with a survey of the students' plans for after high school were used to conduct the analysis. Chapter 1 discusses the historical trends and social conditions that led to the emergence of school-to-work educational reforms. Chapter 2 outlines the methods used to answer the questions about the ability of career academies to meet educational reform needs. Chapter 3 shows how the economic and education-related problems in one city led to adopting the career academy model as the primary focus of high school reform. The next two chapters present multivariate findings from the quantitative analysis, including (Chapter 4) the overall impact of career academies on postsecondary education and labor market outcomes and (Chapter 5) the impact of the career academy as it unfolds in various school environments. Chapter 6 contains a summary and policy implications of the research, concluding that career academies can be quite effective at facilitating postsecondary educational success for their students, with two cautions: (1) the career academy must build academic knowledge and skills in high schools; and (2) the career academy strategy may not be appropriate in all high schools or for all students. (Contains 138 references.) (KC)

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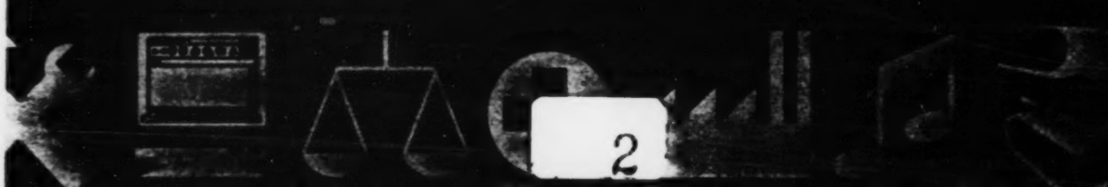

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Nan L. Maxwell and Victor Rubin

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Nan L. Maxwell
and
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The Authors

Nan L. Maxwell is Professor of Economics and Chair of the Economics Department, as well as the Executive Director of the Human Investment research and Education (HIRE) Center, at California State University, Hayward. She has published widely on issues related to racial differences in employment, wages, and academic skills; on income inequality; and on education policy. She authored *Income Inequality in the United States, 1947–1985* (1990, Greenwood Press). Prof. Maxwell earned her undergraduate degree at the University of Texas at Austin, an M.S. and M.L.H.R. at Ohio State University, and a Ph.D. at Florida State University.

Victor Rubin is an Adjunct Associate Professor in the Department of City and Regional Planning and a Research Associate in the Institute of Urban and Regional Development at the University of California, Berkeley. Prof. Rubin received his B.A. in Public Affairs from the University of Chicago and the M.C.P. and Ph.D. from the Department of City and Regional Planning at Berkeley. He co-authored *The Serious Business of Growing Up: A Study of Children's Lives outside School* (1982, University of California Press), one of the first analyses of the "latch-key child" phenomenon. From 1986 through 1991, he was a principal analyst at the firm of Berkeley Planning Associates, managing government-sponsored research in the areas of education, child care, employment training, and community development.

Introduction

The current educational reform movement known as school-to-work calls for restructuring America's high schools to become "high performance" arenas of achievement. Programs developed under this rubric have at their core a curriculum that integrates academic and vocational courses to provide a labor market context for learning. These school-to-work reforms are designed to increase students' motivation to achieve academically and to better prepare them for employment or for higher education. Such reforms necessitate a restructuring of schools that encompasses virtually every operational aspect. The creation of "schools within schools" and the adoption of techniques for contextualized learning are often merely starting points for a total revamping of schools in order to increase student achievement.

It is too soon to fully assess how much long-term impact school-to-work reforms will have. Certainly, proponents of school-to-work approaches are making a sincere effort to radically change and improve an educational system whose basic design was set in an era in which high schools were attended only by a select few. Of course, critics argue that school-to-work reforms are not the solution to current problems. This book represents one small effort at examining one school-to-work program—career academies—to determine the potential of this approach for achieving significant educational reform.

PURPOSE

This book grew out of our experiences in evaluating, researching, and providing consultation for a particular form of educational change, the high school career academy. Career academies represent a type of school-to-work educational reform that has been implemented widely. As they are poised to move from pilot projects and small innovations to broader acceptance and implementation in many cities, a study of the structure and impacts is timely.

Career academies exhibited early evidence of success. As evaluators, we saw, beginning in 1990, how career academies motivated students who were previously disengaged from schooling. These students often blossomed after entering the program. We also observed the enthusiasm that teachers had for the program, how patiently they worked through daily challenges, and how much pride they showed as they relayed stories about their students. Concomitantly, we saw the bureaucratic and financial obstacles to innovation faced in a large, urban school district with an economically disadvantaged student body. As researchers in economics and urban planning, we understood the context in which these academies were growing. Local, regional, and national labor markets were demanding higher levels of academic skills. The long-term trend of declining basic skills in students from urban public schools was continuing, and the disparities in employment and wages were growing. It was not surprising that the academies engendered lofty expectations, not only for improving high schools, but also for making a noticeable difference in the employment outcomes of former students.

We hope that this book will help public education address the inequities and inefficiencies that follow from inadequate preparation of urban students. It was written for labor and education policymakers and for educational practitioners, including principals, assistant principals, department heads, teachers, district office staff, consultants, local school board members, employers, citizens, and parents, who work diligently to improve our schools. It is our sincere hope that this research will help inform policy decisions so that more effective, equitable, and successful educational reforms are pursued. We also hope that our study helps to identify the ingredients necessary for the current round of educational reforms to reach their potential for success.

This book examines the capacity of the career academy to address academic reform in terms of increased education and workplace skills. We do this at two levels. First, we assess the academies' capability to develop and to be implemented within an urban public school environment. For this, we use qualitative data that were collected as part of the seven-year local evaluation of career academies. These data include extensive information about the characteristics of academy programs, the process of institutionalizing the academy model, and the management and administration of such programs. In the analysis, we seek to answer three specific questions about career academies:

- Can the career academy model develop fully within a district to become the primary tool for educational reform?
- Which factors inhibit and which factors facilitate development and implementation of career academies in urban, public high schools?
- How do the structure and resources of the career academy affect its impact?

Second, we assess the academies' potential to facilitate postsecondary success. For this, we analyze a detailed data set that combines complete transcript data on a population of three cohorts of public high school students with a survey of the students about their activities after high school. Our research addresses four specific questions:

- Do career academies in urban high schools increase postsecondary educational opportunities and workplace skills for students?
- If so, how does this increase come about?
- What aspect of the academy improves postsecondary outcomes?
- Are career academies effective for all students and in all school environments?

STRUCTURE

In Chapter 1, we discuss the historical trends and social conditions that led to the emergence of school-to-work educational reforms. As American high schools changed from elite to comprehensive institutions for all, efficiency principles led to their being organized around curriculum tracks with teacher-centered pedagogies (i.e., lecture-discussion format). Although these practices were criticized for their inequitable distribution of students between tracks and for their failure to motivate all students, the general structure was workable as long as the labor market provided jobs to those who did not leave high school with strong academic skills. As such jobs have dwindled, the foundation principles of the organizational structure have become suspect, especially in inner-city schools with large "minority" populations. Current school-to-work reform efforts are an attempt to reorganize school bureaucracies, to blend academic and vocational curriculum tracks, and to make students more active participants in the classroom. It is hoped that these reforms will better prepare students for both postsecondary education and success in the labor market.

Chapter 2 outlines the methods used to answer the preceding questions. Our approach is grounded in the belief that analyzing programs whose goal is academic reform must be done in a "real world" setting, by placing program outcomes within the context of educational bureaucracies and competing political pressures. Our study is grounded in the belief that program development and implementation are inexorably influential on program outcomes. Thus, the environment in which school-to-work programs are implemented must be studied. We use a qualitative analysis of a single district to examine the development and implementation of one such program, the career academy, and a quantitative analysis of its outcomes to assess the potential to facilitate postsecondary success.

The location from which we draw data epitomizes the challenges and difficulties faced by large, inner-city school districts throughout the nation. Of course, research guidelines and respect for privacy preclude revealing the name of the district. In many respects, however, obfuscation only serves to exemplify the typicality of its challenges. The context, trials, tribulations, and frustrations portrayed here are all too similar for any teacher, student, administrator, or school board member in a large, urban public school district.

In an effort to improve educational outcomes, this district adopted the career academy model for educational reform in the high school. During most of this study (1990–1997), nine career academies operated within the district's six comprehensive high schools. We followed the development and implementation of these programs over a seven-year period, five of which overlapped with the years that the students in our quantitative analysis were in school. We obtained transcript and survey data from high school students who were sophomores at comprehensive high schools between 1990 and 1993. We followed this cohort of about 10,000 students through high school and through their first several years after high school. Because about 14 percent of these students were enrolled in career academies, our case study is a rare opportunity to describe the inputs to, output from, and processes associated with this program. By combining the quantitative analysis of individuals with a qualitative study of the nine career academy programs, our research provides insights into academy operations and outcomes. The book, therefore, is organized to capture two broad levels of analysis: development and implementation of career academy programs, and outcomes of academy students as compared to nonacademy students. The two approaches give us a better understanding of how the programs affect students' transition from school to work than if we examined only the individuals or only the institutions.

Chapter 3 shows how the economic and education-related problems in the city led to adopting the career academy model as the primary focus of high school reform. While the district developed a relatively comprehensive model of its school-to-work programs and its career academy programs, important distinctions arose in its implementation from site to site. Many of the differences were created by variations in school environments and in level of funding.

Multivariate findings from the quantitative analysis are presented in the next chapters. First, we assess the overall impact of the career academy on postsecondary education and labor market outcomes (Chapter 4). We find that career academies increase the knowledge and skills that students take from high school. In fact, even though they were not fully implemented in any school, the career academies had a number of positive, measurable effects. Most specifically, academic skills provided by a career academy increase the probability of a student pursuing postsecondary education. In turn, this rise in educational attainment should facilitate labor market success as former students continue to move from school to work. We also found that career academies may improve the potential for lifelong learning. Career academy students were much more likely than were other students to state that their high school program helped them build educational and workplace skills that facilitate learning throughout their productive life. However, as this chapter shows, these positive postsecondary program outcomes are created by the increase in knowledge and skills that students take from high school. We found little evidence that career academy programs, per se, changed educational outcomes or labor market experiences, compared to other high school curricula.

Chapter 5 combines the quantitative and qualitative analyses to assess the impact of the career academy as it unfolds in distinct school environments, with different students, and under varying levels of program implementation. The discussion addresses some of the issues that policymakers must answer before successful programs can be designed and implemented. Can career academies really serve well the interests of a wide range of students? If not, which students are helped most by the program and which students are not helped? What features of the school environment, the academy program, and the student's experience in the academy contribute to the program's ability to increase the academic skills taken from high school?

We show that the various academies generated different levels and types of benefits. Two of the underdeveloped programs showed no evidence of building participants' knowledge and skills in high school, of stimulating postsecondary educational attendance, or of increasing the potential for lifelong learning (Chapter 4). In contrast, two of the more developed academies improved students' skills in high school, increased the probability of postsecondary educational attendance, directly and indirectly through building skills, and elevated the potential for lifelong learning (Chapter 4). The differences in the various career academies' success suggest that student benefits may depend on ensuring that the programs are well conceived and fully implemented.

We found that the academies' environment, resources, and participants varied in systematic ways. Specifically, differences existed among the academies along several lines. First, there were variations in the relative preparedness of academy students as compared to the balance of the student body of the school that housed the academy. Second, programs developed at distinct paces and in different ways. Academies at schools with students in the middle of the socioeconomic spectrum were the most completely developed, especially as compared to those at the high-status schools. Finally, school environments in which the academy operated varied substantially.

As a result of the developmental circumstances, variations existed in how much exposure students of the academy had to its curriculum or work experiences. Because of the range of school environments, academies occupied several niches in the various high schools. These and other differences among academies and schools reflected a system in transition that we were able to portray by combining our quantitative and qualitative approaches.

We conclude with a summary and with the policy implications of the research (Chapter 6). In a nutshell, our study shows that career academies can be quite effective at facilitating postsecondary educational success for their students. However, we also issue two cautions to policymakers and administrators. First, the career academy must build academic knowledge and skills in high school. There is no getting around this, and no shortcut to achieving this. Simple exposure to careers, for example, is not sufficient, nor should it become an end in itself. Without building scholastic and skill achievements above levels of traditional high school programs, the additional cost of academy programs may not be warranted. Second, the career academy strategy may not be appropriate in all high schools or for all students. All environments may not be hospitable to academy development, and academies may evolve distinctly within the same environment. The reasons for these variations lie beyond the data presented in this study and suggest that further research is needed on both student achievement and institutional development. However, our findings raise important questions about the circumstances under which these ambitious programs can flourish and about which students are most motivated and enhanced by this approach to teaching and learning.

1

The Roots of Educational Reform

Historical Continuity and Contemporary Strategies

A tension has always existed in American schooling between educating students for employment and educating them for citizenship or personal development. Within high schools, this tension is submerged for college-bound students, given the overriding goal of preparation for postsecondary studies. For this group, admission standards to four-year colleges have been clearly drawn, and the motivation to perform well in school is driven by these standards. No such guidelines have been established for the students not bound for college. For them, the tension between the conflicting goals of education often leads to incoherent or ineffectual high school programs. In fact, students who are not college bound often have minimal incentive to study, because they see little or no relationship between how well they do in school and what kind of job they can get subsequently. The result in many cases is the failure to motivate all but the students enrolling in a four-year university. Others are often left without the basic skills that they need to function in the workplace.

This chapter traces the evolution of contemporary American high schools to illustrate the historic origins of these tensions and "failures." We then outline some current critiques of American education and show how school-to-work reforms arose to address these critiques. The discussion provides a backdrop for the evolution of school-to-work strategies in general and of the career academies in particular.

HOW DID HIGH SCHOOLS COME TO BE THE WAY THEY ARE?

Contemporary American high schools were designed in and for another age. In fact, the structure of today's high school was set in the latter part of the 19th century, when high school graduation was not a prerequisite for admission to college and the economy was moving rapidly from an agricultural to an industrial base.[1] In 1890, just years after the first formal resolutions by educators proclaimed the value of secondary education, less than 1 percent of the population attended high schools. Most high schools required entrance examinations, and most were located in urban areas. Phenomenal growth ensued, however. By 1915, the total high school population had increased by over 500 percent, and by 1940 approximately 70 percent of youth aged 12 to 19 were in school. Today, 96.6 percent of students aged 14 to 17 are in high school (Snyder and Shafer 1996). Despite phenomenal growth in attendance, the basic curriculum, administration, and structure of the high school have remained unchanged.[2] In fact, the rapid growth in student enrollment helped structure today's comprehensive high school.

The current "comprehensive" high school has at least three defining characteristics. First, it is inclusive, striving to meet the needs of all students, including the academically gifted and the academically challenged, the vocational and the college-oriented student, the wealthy and the poor. Second, the high school's curriculum is grounded in a core program of general education that allows for differentiation in the course of study. This curriculum differentiation is targeted to meet the needs of specific groups of students. Third, a teacher-centered pedagogy dominates the learning environment. A teacher is the "sage on the stage" who provides relevant material to students. Teachers view themselves, and are viewed by students, as curriculum area experts who transmit information to students predominantly by lecturing and otherwise imparting facts and guidance.

It is, arguably, the inclusiveness that defines today's high school. The following well-cited passage, with its now quaint examples, exemplifies this philosophy and its continued influence:

> The comprehensive high school is a peculiarly American phenomenon. It is called comprehensive because it offers, under one administration and under one roof (or series of roofs), secondary education for almost all the high school age children of one town or neighborhood. It is responsible for educating the boy who will be an atomic scientist and the girl who will marry at eighteen; the

> prospective captain of a ship and the future captain of industry. It is responsible for educating the bright and the not so bright children with different vocational and professional ambitions and with various motivations. It is responsible, in sum, for providing good and appropriate education, both academic and vocational, for all young people within a democratic environment which the American people believe serves the principles they cherish. (Foreword by John Gardner in Conant 1959)

In the early years, the task of educating students who were heterogeneous with respect to interests, goals, and background created chaos in the high schools.[3] Curriculum tracking and teacher-centered pedagogies were developed as organizing mechanisms. Curriculum tracking arose from the National Educational Association's 1918 outline for curriculum structure, which, in theory, provided something for everyone. Under this system, junior high school was the time when students acquired a wide variety of experiences to help them make decisions about academic and vocational futures. The high school housed the distinct curricula, so that students could specialize and meet their future goals. This specialization occurred, in theory, within a setting that promoted unity among students. Around the same time, the businessmen on school boards began promoting the scientific management principles of Frederick Taylor as a way to administer education efficiently. Within this management framework, producing educational products, students, at the lowest possible cost was the touchstone for managing the problems that accompanied increased enrollment. Both teacher-centered pedagogies, which were cost-efficient for curriculum delivery, and the vocational curriculum, which was efficient in providing students with specific skills, applied scientific management principles to education.

CURRENT CRITIQUES OF COMPREHENSIVE HIGH SCHOOLS

The fundamental tensions and problems posed to schools at the beginning of the century differ little from those posed to contemporary high schools. In many local communities, current challenges focus on the mismatch between workers' skill levels and employers' needs, and the resultant inefficiencies and inequities in labor market outcomes. Both public and private sector leaders cite economic and labor market trends showing an increasing demand for workers with higher levels of skills, and statistical evidence suggesting that our schools produce students who are unable to meet these requirements. Antiquated urban schools and nonchallenging curricula underlie the view that our schools fail to provide an adequate education to all groups of students. Curriculum tracking and teacher-centered pedagogy are heavily criticized for their failure to motivate and to meet the educational needs of all students.

External Pressures on Schools: Skill Mismatches in the Labor Market

Technological changes in the labor market during the 1980s and 1990s produced a dramatic increase both in the demand for skills and in youth unemployment (e.g., Silvestri 1997; Rees 1986). One result was an increasing divergence between the "haves" and "have nots" in labor market outcomes. Individuals who left school with relevant skills received increasing returns for their efforts, while those who left school without skills often faced long-term unemployment (Klerman and Karoly 1994). In addition, the labor market changes that heightened the demand for skilled workers also elevated the earnings of college graduates as compared to high school graduates (Katz and Murphy 1992; Levy and Murnane 1992). Concurrently, factors such as greater uncertainty in product markets and more international competition left employers less willing to hire employees on a long-term basis. These trends suggest that current labor market entrants should expect to change jobs, if not occupations, six to eight times (e.g., Maguire 1993) and to face a market in which temporary positions represent an increasing proportion of employment opportunities.

The discrepancies in hiring experiences and earnings between the skilled and unskilled widen as more time is spent in the labor market. Individuals who enter the workforce with skills expand this base with on-the-job training, while individuals without skills continue their struggles (Cappelli 1993). This is, in part, because poorly prepared entrants are less likely to obtain employment that provides on-the-job training and that starts people along genuine career paths (Grubb 1993). As a result, the demand for skilled workers (Judy and D'Amico 1997; Holzer 1996) combines with the relatively large number of unskilled youth to create situations in which severe shortages of trained workers coexist with relatively high levels of youth unemployment (Howell and Wolff 1991).

Because people are expected to change jobs and occupations frequently, and because skills are increasingly important in determining employment and wages, individuals must upgrade what they learned in school throughout their work life. That is, to remain competitive in the labor market, people must invest on an ongoing basis in their human capital and engage in what is frequently called lifelong learning. This continuous upgrading is more readily done when one has good foundation skills (Altonji and Spletzer 1991; Shaw 1984).[4] Without mastering the basics—communications, writing, mathematics, computer technology, and science—individuals are severely handicapped when entering the labor market and when seeking advanced training after high school.[5] Acquiring foundation skills in school, therefore, provides workers with better access to occupations with career-building learning and experience (i.e., promotional ladders, as discussed in Sicherman and Galor 1990) by placing them in occupations with training opportunities (e.g., Barron, Black, and Lowenstein 1989; Hanushek and Quigley 1985).

Increasing the skills of new labor market entrants poses less of a challenge than retraining older workers (and earns a higher return on investment!); therefore, the knowledge and skill levels of young labor market entrants are a focal point for closing skill mismatches. Three persistent problems exist with this strategy, however. First, the academic performance of our students is weak by international standards. Concern about these low levels of knowledge and skill levels was greatly intensified by the decline in assessment test scores during the 1970s. Student scores on the Scholastic Aptitude Test (SAT) decreased steadily during the 1960s and 1970s, and the National Assessment of Educational Progress (NAEP) scores slipped more modestly throughout the 1970s.[6] Although some of the discouraging achievement trends of the late 1960s and 1970s were reversed by the middle of the 1980s, results of the Third International Math and Sciences Studies

(TIMSS) show that U.S. 12th graders were outperformed by students in 14 other countries (Mullis 1997).

Second, educational gaps exist between sociodemographic groups in the United States. Weak knowledge and skill levels are displayed by traditional minority groups, students attending Title I (Compensatory Education) schools, and students with a relatively low socioeconomic status background (Education Trust 1998). These segments are also most likely to truncate their education in high school, a condition that often results in extremely low levels of knowledge and skills. About 35 to 45 percent of adults with a high school diploma or graduate equivalency diploma (GED) and 75 to 90 percent of adults with fewer than eight years of education who participated in federal programs scored in the two lowest (of five) literacy categories in a skill assessment (Kirsch, Jungeblut, and Campbell 1992).

Third, the lack of learning for students who cut off their education in high school fuels an attitude of discouragement and apathy. Students who leave high school without skills face relatively high levels of unemployment and low wages (Decker et al. 1997). Consequently, some youth, particularly unskilled, inner city youth, see little payoff to education and devote even less effort to their schooling (Levin 1983). Whether this results from young people's realistic cynicism about a society that cares little about them, or from their unrealistic ideas about what it will take to succeed, the outcomes can be similarly bleak. By underperforming, students later find it more difficult to obtain employment.

These problems are especially acute in inner cities, as low-skill jobs and high-wage workers migrate out from the center. This increased spatial inaccessibility to jobs has created employment difficulties (Ihlanfeldt 1992; Kasarda 1985) and social isolation (Wilson 1987) for urban minorities. As a result, workers in many urban areas have skills that are poorly matched with the nearby jobs (Ihlanfeldt and Sjoquist 1990; Cain and Finnie 1990). Ethnic minorities and the poor, mostly urban residents, are therefore disadvantaged in a labor market irrespective of the factors that are used in employment decisions: characteristics of workers (e.g., Lynch 1989), academic performance (Maxwell 1994; Meyer and Wise 1982), and race (e.g., D'Amico and Maxwell 1994; Bound and Freeman 1992; Ellwood 1982).

Internal Pressures on Schools: Diversity, Politics, Pedagogies, and Tracking

Urban public high schools, in particular, are often heavily criticized for producing students who cannot meet the knowledge and skill requirements of the labor market.[7] Knowledge and skill levels of students in urban schools are far lower than those of students in other types of communities. For example, the typical high school has about 15 percent of its students who would be considered superior in skill and motivation, and 15 percent who have skill or learning deficiencies, with the remaining 70 percent falling somewhere in the middle. In (the average) urban schools, 35 percent of the students typically perform one or more grade levels below average on nationally normed reading tests, and the faculty frequently report that about 25 percent of students have learning disabilities. These deficits challenge teachers as they attempt to educate the academically gifted in an environment of poorly prepared students (Montgomery and Rossi 1997).

The range of knowledge and skills is but one of the challenges for teachers in urban public high schools (McQuillan 1998; Lois and Miles 1990). Cultural and racial diversity is also the norm. Although the typical teacher in such schools is white, the typical student is not, with the demographic composition of students becoming more varied over time (Table 1.1). During the 1980s, the share of white, urban high school students fell from a majority of 54.5 percent to 45.4 percent, while Latinos[8] and other (mostly Asian) groups enlarged their relative presence. Because both of these subpopulations contain a relatively high proportion of English as a second language (ESL) students, their growth most likely increased the percentage of students with limited English abilities (Table 1.1). The growing demographic diversity in urban public high schools as a whole has not necessarily led to demographic diversity within schools. Students are still relatively segregated, as the table shows. For example, white urban public school students attend schools that are two-thirds white, while African-American students attend schools that average 58.5 percent African-American. Student-body demographic characteristics appear to be highly correlated with the ratio of students eligible for free lunch, as the popular press and research have repeatedly illustrated.

Table 1.1 Percentages over Time and Demographics in the Urban Public High School Experience (1982–1992)[a]

Characteristic	1982 All students	1992 All students	Whites	African-American	Latino	Asian	Nonnative English
Race/ethnicity of student body							
White	54.5	45.4	66.7	26.2	22.1	34.3	22.9
African-American	32.3	28.9	16.3	58.5	22.2	17.6	23.1
Latino	11.2	19.4	11.4	11.0	50.8	22.0	44.4
Other	2.0	6.3	5.6	4.3	4.9	26.1	9.6
Student body							
Students with nonnative English[b]	10.1	12.4	9.2	9.0	23.4	17.2	23.7
Students on free lunch	NA[c]	27.9	18.4	35.7	40.3	26.4	40.0
N	2,483	2,184[d]	891	412	569	289	548

[a] Sample is confined to students in urban public high schools. Numbers represent weighted means from the National Center for Education Statistics data bases, National Educational Longitudinal Study (NELS; 1992) and High School and Beyond (HSB; 1982). The weighting factor differs slightly between the data sets. For NELS, the weight is based on making the sample of individuals who took the achievement tests in the sophomore year representative of the 10th grade population. For HSB, the weight is based on making the sample of individuals who were part of the sample in three consecutive surveys (approximate equivalent of 10th grade, 12th grade, and two years out of high school. Appendix I provides a detailed discussion of the data.

[b] Nonnative English speakers are 60.6 percent Latino, 31.2 percent Asian, 5.7 percent white, 1.5 percent African American, and 1 percent "other."

[c] NA = the data are not available.

[d] The 1992 "All students" sample includes individuals whose ethnicities are not reported separately.

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Demographic and ethnic diversity also characterize the communities that surround city schools. This creates a greater number of constituencies for urban than for either suburban or rural schools. Also, urban politics are often more turbulent than politics in other areas. In central cities, many other policy dilemmas compete with education for attention and resources, whereas schools and education more often take the forefront in suburban and rural settings. Unfortunately, within urban areas, fundamental problems of early child development, community health and safety, and structural unemployment lead whole neighborhoods of children to enter school underprepared. The seemingly overwhelming social and economic difficulties can create a sense of fatalism in urban schools: it doesn't matter what the school does, the outside world is controlling the fate of the education system and its children (e.g., Steinberg 1996).

Urban high schools and problematic, large district bureaucracies often go hand in hand. In contrast to suburban and rural settings, where district offices are usually smaller and schools may hold a great deal of autonomy, urban district offices are frequently impenetrable bureaucracies with many personnel who rarely come in direct contact with the schools. Despite the size and diversity of their schools, there is also tremendous political pressure for districtwide uniformity of curriculum and procedures. As a consequence, policy changes many times come from the top in the form of new programs and regulations, which may conflict with or replace those that individual schools already have begun to incorporate. The result can be a cycle of frustration, as failed or aborted efforts to improve schools lead even the most committed site personnel to become very cynical about reform.

There is no shortage of proposed alternatives to the old ways of educating students. Many of the specific approaches to redesigning high schools respond to students' disengagement from academics. This detachment is often manifested as either dropping out or failing to learn while still enrolled and is frequently blamed on the irrelevance and ineffectiveness of teacher-centered pedagogies and on the legacy of tracking students into different curricula.

Disengagement associated with teacher-centered pedagogies (such as lecture-discussion accompanied by students completing assigned materials) arises from the passive nature of learning. Students are expected to absorb content material that is delivered by teachers. Tests are often instruments of evaluation and control, a technique that supposedly undermines intrinsic motivation and builds passivity toward learning (e.g., Deci and Ryan 1980). This perceived failure of traditional teaching methods to motivate students has fostered a movement toward a student-oriented delivery of curriculum (e.g., Schlechty 1990). In that framework, instruction becomes less teacher-centered and more focused on students, less generic and more personalized, less competitive and more cooperative. Student-centered pedagogies frequently focus learning "in context," an idea often associated with John Dewey (1916). Because contextual teaching develops concepts and skills holistically instead of as fragments, students can understand more thoroughly that they are part of a system in which they hold responsibility for their own learning. Educational environments become more realistic because concepts and skills are taught, as closely as possible, in the context in which they will be used.

Curriculum tracking is also criticized for creating student disengagement from school. In most high schools, students are placed into vocational, general, or academic programs upon entrance. This approach usually presents the student with a fragmented, smorgasbord-like tool for building a curriculum. Students select courses from a list that fulfills the requirements of a particular track. This is a relatively low-cost approach to organizing the curriculum because the teaching and learning in courses are adapted to the school's (and district's) organizational structure. The system generally benefits students in the academic track, even by two years after an on-time graduation, as Table 1.2 shows.[9] Results of the probit analysis presented here show that students in the academic track have an increased probability of graduating from high school and of attending postsecondary education as compared to students in the unstructured general track. That is, the coefficients on enrollment in the academic track have a statistically significant influence on raising the probability of furthering education. In addition, a greater portion of the students in 1992 than in 1982 benefited from the relative advantages of the academic track, as evidenced by the larger coefficient size and increasing number of significant coefficients for all demographic groups.[10]

The academic track not only increases education for students, it also leads to greater future employment and earnings (Meyer and Wise 1982). Specific academic courses provide few returns to earnings

Table 1.2 Effect of High School Program on Achieving Educational Benchmarks by Two Years after an On-Time Graduation[a]

Characteristic	Academic program		Vocational program		N	
Class of	1992	1982	1992	1982	1992	1982
Share enrolled	38.6%	41.1%	15.1%	36.1%	2,184	2,483
Estimated coefficients for						
All students[b]					2,064	1,718
% high school graduate	0.718**[c]	0.467**	–0.047	0.186		
% attend 2- or 4-year college	0.848**	0.376**	–0.336**	–0.154*		
% attend 4-year college	0.863**	0.475**	–0.340**	–0.326**		
Whites					870	697
% high school graduate	0.688**	0.639**	–0.117	0.113		
% attend 2- or 4-year college	0.968**	0.392**	–0.270*	–0.260*		
% attend 4-year college	0.832**	0.500**	–0.856**	–0.445**		
African Americans					380	482
% high school graduate	1.464**	0.277	0.144	0.052		
% attend 2- or 4-year college	0.846**	0.282	–0.635**	–0.056		
% attend 4-year college	1.116**	0.459**	–0.231	–0.076		
Latinos					543	424
% high school graduate	0.421**	0.671**	–0.042	0.468**		
% attend 2- or 4-year college	0.622**	0.462**	0.122	–0.159		
% attend 4-year college	1.000**	0.254	0.365**	–0.573**		

(continued)

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Table 1.2 (continued)

		Academic program		Vocational program		*N*	
Characteristic	Class of	1992	1982	1992	1982	1992	1982
Nonnative English						532	549
% high school graduate		0.719**	0.507**	–0.124	0.344**		
% attend 2- or 4-year college		0.652**	0.163	–0.180	–0.096		
% attend 4-year college		0.831**	0.687**	0.218	–0.306		

[a] Data are from students in urban public high schools in the NELS (1992) and HSB (1982) and are weighted as outlined in the footnote of Table 1.1. Relationships are based on estimated coefficients of a series of probit analyses on achieving educational benchmarks (high school graduation, attending either a two- or four-year college, and attending a four-year college). The full results of the estimations are available from the authors. Appendix I provides a detailed discussion of the data estimations.

[b] The "All students" sample includes individuals whose ethnicities are not reported separately.

[c] ** = significant at $p \leq 0.05$.

* = significant at $p \leq 0.10$.

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(Altonji 1995), however. This suggests that either a carefully selected package of complementary coursework or the negative effects of the nonacademic tracks (such as decreased self esteem) produce the positive outcomes from enrollment in the academic program (e.g., Oakes 1985). The rise in earnings from academic track enrollment is indirect, however, and works through the increased probability of educational attainment, as Table 1.3 shows. Our probit estimations indicate that academic programs increase the probability of degree completion at all levels of education. However, it is education and not curriculum track that lifts labor market earnings. In fact, the positive impact of the academic track on education two years after high school that was seen in Table 1.2 generally dissipates for African Americans, Latinos, and nonnative English speakers by about 10 years after leaving high school. That is, the coefficients on the academic track are generally insignificant ($p \leq 0.05$) with respect to increasing postsecondary education.

Of course, not all academic tracks are equal. In fact, differences in economic outcomes may result, in part, from the heterogeneity of human capital that is built within each track (Maxwell 1999.) Specifically, the production of human capital in high school depends not only on the label of the track but also on the students' actual courses and experiences: the track's curricular components. Variation within tracks may be as significant as differences between tracks in the production of human capital in high school.

These results suggest that the academic track generally fulfills its mission of increasing the education of its students, although the effect may not be uniform. Students in other tracks do not always fare as well. The probability of attending postsecondary education is reduced for students leaving the vocational track as compared to general track students (Table 1.2). In some respects, this finding, while important, is not surprising, since traditional vocational education was designed to lead students to skilled trade positions rather than to college. Vocational education programs should improve labor market outcomes for graduates. In fact, valued labor market skills are provided to students in some vocational programs (e.g., Neuman and Ziderman 1991, 1999). Earnings increase by about 8 to 9.5 percent, and unemployment falls for high school completers who work in jobs related to their vocational courses (e.g., Bishop 1989). Positive outcomes from vocational education programs also are associated with highly specific training,

Table 1.3 Effect of High School Program on Obtaining Educational Degrees and on Earnings 10 Years after an On-Time Graduation[a]

	High school program		
Characteristic	Academic	Vocational	*N*
Estimated coefficients for			
All students[b]			
% high school graduate	0.519**[c]	–.074	1,476
% certificate or associate's degree	0.532**	0.038	1,476
% baccalaureate's or higher	0.629**	–0.211	1,476
Annual earnings[d]	–0.038	–0.076	1,083
Whites			
% high school graduate	0.545*	–0.214	629
% certificate or associate's degree	0.780**	0.062	629
% baccalaureate's or higher	0.825**	–0.300	629
Annual earnings	0.034	–0.035	486
African Americans			
% high school graduate	0.080	–0.573*	396
% certificate or associate's degree	0.314	0.175	396
% baccalaureate's or higher	0.190	0.007	396
Annual earnings	–0.172	–0.163	262
Latinos			
% high school graduate	1.435**	0.470**	356
% certificate or associate's degree	0.179	–0.476**	356
% baccalaureate's or higher	0.345	–0.831**	356
Annual earnings	–0.019	–0.179	266
Nonnative English			
% high school graduate	0.481**	0.075	438
% certificate or associate's degree	0.132	–0.110	438
% baccalaureate's or higher	0.217	–0.203	438
Annual earnings	0.141	0.123	291

(continued)

Table 1.3 (notes)

[a] Data are from the 1992 activities of students in urban public high schools in the National Center for Education Statistics, HSB (1982), and are weighted as outlined in the footnote in Table 1.1. Relationships are based on estimated coefficients of a series of probit analyses on achieving educational benchmarks (high school graduation, a certificate of associate's degree, and a baccalaureate's degree or higher) or ordinary least squares analysis (annual earnings). The full results of the estimations are available from the authors. Appendix I provides a detailed discussion of the data and estimations.

[b] The "All students" sample includes individuals whose ethnicities are not reported separately.

[c] ** = significant at $p \leq 0.05$.
* = significant at $p \leq 0.10$.

[d] Annual earnings were estimated only for individuals who had earnings in 1992.

particularly in areas that are in demand in the labor market (Rumberger and Daymont 1984). Vocational education coursework may be most beneficial when combined with competency in basic skills. While students who take more vocational coursework within an occupational specialty have increased earnings as compared with those who undertake an academic curriculum (Kang and Bishop 1989), sharp diminishing returns occur after four courses, perhaps because participation may stigmatize workers in the eyes of employers (e.g., Hotchkiss 1993; Meyer and Wise 1982). Students on a general track may be the most disadvantaged after high school. Within the track, low expectations and a lack of coherence often characterize unrelated and watered-down classes. As a result, students are unprepared for work and for further study. Perhaps because of the problems in their programs, the academic skills of vocational and general track students decrease during high school, while the achievement test scores of college-track students increase (Hamilton 1990).

CURRENT EFFORTS AT EDUCATIONAL REFORM

These long-standing challenges and ongoing criticisms of American high schools have produced a series of attempted educational reforms. Such efforts mirror the dominant social and political issues of their times and, as such, often have a relatively short life span and limited long-term effect. This was succinctly summarized by two sociologists:

> The resilience of education as an issue in the American political and social agenda is quite remarkable. Although the particular themes that command attention shift about with changing circumstances, it is rare indeed for education to be far from the center of the national debate. During the post-Sputnik fifties, energies were mobilized to redress presumed failures of public schooling in the areas of science and technology. Throughout the sixties and much of the seventies, equity issues were dominant. The preeminent concern during much of that period was to guarantee equal educational opportunities for racial and ethnic minorities. More recently the focus again has shifted to questions of educational quality . . . (Alexander and Pallas 1984)

Evolution of School-to-Work Programs

The initial knowledge and skill crisis brought educational reform to national prominence with the 1983 National Commission on Excellence in Education's influential report commonly known as *A Nation at Risk*. The report was blunt and eminently quotable in its pronouncement that our educational system is unable to provide necessary technical knowledge and skills or to reverse "a rising tide of mediocrity." The Commission called for curriculum revision such that all high school graduates would master the "Five New Basics."[11] The Commission characterized these deficiencies as fundamental nationwide problems of education and economic competitiveness, rather than as simply a continuation of the well-known shortcomings of central city schools serving children in poverty. In that respect, "Back to Basics" was analogous to the societywide mobilization for science education that occurred after Sputnik. It was a movement to increase the general human capital brought from high school.

The school-to-work reforms begun during the early 1990s were somewhat broader and included a different form of human capital accumulation, industrial and occupation-specific human capital. Partnerships were initiated between employers and educators to integrate high academic achievement with active learning in real world jobs. The approach was grounded in recognition of the massive changes underway in the nature of work itself, in an increasingly globalized economy (U.S. Department of Education 1994a; U.S. Department of Labor 1991).

Three pieces of federal legislation passed in the early 1990s addressed these needs and codified many of the consensus ideas about best practices in the new integration of school and work. These were the Goals 2000: Educate America Act, The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 (commonly known as "Perkins II"), and the School-to-Work Opportunities Act of 1994. While Goals 2000 concentrated on increasing standards for students and professional development for teachers, Perkins II and School-to-Work focused more specifically on curriculum and organizational changes deemed necessary to impart job-related skills and background to students.[12] Both of the latter pieces of legislation represented a departure from previous educational reform by stressing the integration of vocational and academic learning.[13]

School-to-Work (or, in some places, School-to-Career) was the label given to reforms that were consistent with these legislative efforts. A complete school-to-work system was supposed to provide students with the skills necessary to succeed academically in high school and to continue their education (i.e., provide them with *general* human capital) yet also impart the industrial and occupationally *specific* human capital necessary to succeed in the labor market. The belief was that the provision of only work-based training in lieu of academic knowledge and skills would reestablish the two-tiered education system that had been embodied by curriculum tracking. Instead, school-to-work reforms would provide both work-based and academic knowledge and skills to all students.

A fully realized school-to-work system would require massive changes in how high schools operate. Theoretically, school-to-work programs would erase the distinction between academic and vocational curricula through an integrative framework, new methods of instruction, and heterogeneous student composition. Successful integration would allow high school students to gain workplace knowledge and skills without reducing academic learning. The complete school-to-work system would encourage active participation by business, post-secondary education, and community sectors. The high school would be fully articulated with community colleges and universities. All parties would have access to current labor market information about the skills in demand, and the curriculum would convey a portable set of skills that had been validated by national boards (e.g., Ravitch 1995a, 1995b). Adherence to the standards would provide students with the flexibility to pursue either employment opportunities or continued education upon high school graduation.

Proponents of school-to-work systems see them as neither a revamping of traditional vocational education nor limited to students who would otherwise be in vocational programs. Instead, most advocates argue that the new approach can serve a broader base of students and meet the need for increased academic rigor that was set forth in *A Nation at Risk*. In fact, many of these initiatives establish connections between high school and community college, and many are designed to keep university attendance open as an option for students, even as they pursue more technical training. As such, school-to-work programs seek to develop academic and work-based skills for all segments of the student population. If successful, these efforts would increase the ability of students who might otherwise be in vocational tracks to pursue postsecondary education and would increase the work-based skills of students who might otherwise be in the academic track.

Innovations of the scope described, if carried out to their full potential, would not be simply another round of categorical programs imposed on the traditional high school structure. Rather, high schools would be reformed and restructured. Reforms would reach the entire, or nearly entire, student body and teaching staff and changes would be made in many of the school's most fundamental assumptions and methods. Numerous observers worry that, without whole-hearted investment in comprehensive change, the results could be a "tired retread," a recapitulation of the inequities of old-style vocational education and curriculum tracking:

> The most likely development, without a clear vision of how high schools should change, is that the great interest in work-based learning and the lack of interest among educators in occupationally oriented education will create the worst of all worlds. Work-experience programs will provide some work opportunities for at-risk students, in high schools that remain dominated by the college-bound track, utterly failing to reshape the high school in any important way. (Grubb 1994)

Even with the desire to make fundamental changes, entirely new ways of operating schools will not fall into place overnight. The comprehensive school-to-work programs planned and implemented during the mid 1990s were built upon a series of more specialized approaches developed over the last several decades. Most programs consist of structured curricula based on an active integration of work and school-based learning.[14] This melding is usually built within one of two approaches: a work-based focus (such as cooperative education, school-based enterprises, and youth apprenticeship) or a school-based focus (such as tech prep partnerships and career academies). While many high schools develop both strategies simultaneously, this distinction highlights some central differences between programs. Those that integrate work into school-based learning (the school-based focus) stimulate academic education with a workplace context. Programs that integrate academic learning into work-based activities (the work-based focus) broaden the definition of job skills to include academic achievement.

While the philosophy underlying both approaches stresses the centrality of the context in which teaching and learning occur, the primary emphasis of the environment differs. Work-based programs seek to improve learning by shifting student time from the classroom into the workplace. The assumption is that experiences in the adult world of work are a powerful catalyst to improving self-esteem and to building workplace and academic skills. Getting young people out of the classroom and into work is the underlying teaching philosophy. Traditional vocational education programs, including cooperative education, school-based enterprises, and youth apprenticeships are grounded in this philosophy.[15]

School-based learning programs use contextual teaching of academic subjects; work is brought into the classroom by applying academic knowledge to a particular career or industry instead of presenting the theoretical underpinnings in isolation. Social studies, humanities, literature, and history are integrated around a career and contemporary issues so that the students' understanding of a field is enhanced while academic learning occurs.[16] Although many "informal" approaches exist that integrate curricula (e.g., Urquiola et al. 1997), the technical preparation (tech prep) partnerships and career academies are the most formally developed school-to-work programs that employ this contextual learning philosophy.[17]

The Career Academy Model

The career academy is arguably the most well-developed school-to-work program model focused on school-based learning. It may, in theory, have the best chance of effectively combining school-based and work-based education, actively involving employers and other community partners, and engaging a truly heterogeneous cross section of students. Because of its comprehensive goals, the career academy model can be both a catalyst for school change, and, in some respects, a hostage to schoolwide inertia.

The career academy constitutes a "school-within-a-school" and coordinates curriculum and activities around a single occupation, profession, or industry that is of importance in the local labor market (Stern et al. 1988, 1989; Stern, Raby, and Dayton 1992; Dayton et al. 1992). Although variation exists in career academy models across the country, they share several core elements: school-within-a-school structure, integrated academic and vocational curriculum, and employer and workplace involvement. The school-within-a-school environment isolates students from the problems that exist in the larger institution and provides a social and scholastic support structure. Core academic subjects are integrated with vocational/technical laboratory courses and emphasize the relationship between education and the workplace. Although students do not earn formal occupational skill credentials, they often work in the industry of focus during the summer after their junior year. Employers are actively involved in building the curriculum and in donating time as mentors and workplace supervisors.

School-within-a-school structure

Academies create structures within schools for grades 9 to 12 or 10 to 12 by clustering small groups of teachers and cohorts of students who stay together for many of their courses throughout their high school career. Typically, a team of between three and five teachers works with approximately 50 students (two classes) per grade. The school-within-a-school approach provides a more personalized learning environment and creates a strong peer and teacher support system for working hard in school. The clustering of teachers enables collaborative work that can focus on the educational and developmental needs of the students. It also promotes active involvement of parents in the educational process. Because academy teachers often have a common planning period, they are better able to design interdisciplinary projects centered around the career theme and to build relationships with employers.

Integrated academic and vocational curriculum

Career academies integrate the curriculum around a career theme in a field for which employment is growing in the local labor market. The program combines technical and academic content, usually through one technical and three academic classes each semester. Career academies expose students to a whole range of occupations in an industry and give students the option of pursuing advanced technical and academic training at the community college and university level.

Employer and workplace involvement

Employer representatives from the academy's career field help plan and guide the program and are involved as speakers, field trip hosts, job supervisors, and sometimes as mentors for individual students. Pupils often engage in career awareness in the initial year (such as attending job fairs, taking field trips, hearing speakers), connect with mentors in the second year, have an internship in the summer between the junior and senior year, and (at times) undertake part-time employment during the senior year.

Within this basic framework, there is considerable diversity in the models implemented around the country. Academies develop in a variety of settings and emerge from a number of different templates. Sometimes they represent a small proportion of a school's population, while in other cases they are "wall-to-wall" and encompass the entire school enrollment. Several national organizations promote replication of a particular academy model tied to a specific industry, such as finance or tourism, but many, if not most, academies are not so literally affiliated. While some academies are more than a decade old,[18] most are much newer. In recent years, the career academy program has experienced rapid growth and experimentation. Preliminary studies suggest that career academies reduce dropout rates, increase postsecondary school attendance (e.g., Dayton 1997; Kemple and Rock 1996; Stern et al. 1988), and improve job performance and work attendance (e.g., Linnehan 1996).

SUMMARY AND CONCLUSIONS

Parents, educators, political leaders, and communities in general are concerned about the failure of public schools in U.S. cities to give an adequate education to our children. Many constituencies feel that today's public comprehensive high schools do not provide a rigorous and relevant education to a widely diverse student body. Urban high schools are routinely criticized for graduating students without the knowledge and skills necessary to succeed in either postsecondary education or in the workforce. As unemployment decreases and the premium paid for education and skills increases, the disapprobation of schools intensifies.

One response being offered by the educational community is to break down the century-old idea of program differentiation between academics and vocations and to build more active student-centered learning. This is being done through new types of curriculum and pedagogies to improve the motivation to learn. Approaches to integrating existing curricula vary, but virtually all of them have an underlying philosophy of using an occupational focus and workplace context to stimulate academic learning. These "school-to-work" reforms strive to help students achieve scholastically and to provide them with marketable workplace skills.

The career academy is one of the best-established school-to-work programs. This approach builds a "school-within-a school" and offers a small group of students an integrative curriculum focused around a specific career theme. The model contextualizes and brings together course work around an occupation or industry to motivate students to learn academics. This merger is strengthened through active employer involvement in curriculum development and internships. By contextualizing learning around a specific career, students begin to realize that knowledge and skills learned in school can lead to productive, interesting work. Finally, the small community environment that career academies provide supports student learning and achievement.

The potential of the career academy to reform education is the focus of this book. We examine how one city and its school district, which were struggling with the challenges posed by changes in the labor market and in educational expectations, adopted the career academy model to increase skills and to spur economic development with a knowledgeable and trained workforce. We see that, although these efforts led to the development of a single model within the school district, critical differences appeared among various schools and academies. The heterogeneity in the development and implementation of the model, which arose from real world political, community, and funding decisions, suggests that the career academy's impact on educational outcomes is not uniform. Thus, while the model fulfills the goals of educational reform in theory, its implementation raises questions about its ability to serve all students. Sorting out the results for students of putting the model into practice is the essence of our analysis.

Notes

1. This history of education and the comprehensive high schools draws heavily from Conant (1967), Krug (1964), Lurry and Alberty (1957).
2. Differences exist between the modern and turn-of-the-century high school. However, they lie mainly in the composition of students in classes (e.g., males and females are now in the same career classes) and in the social interactions (e.g., less formality exists in the relationship between teachers and students).
3. In 1892, John Eliot (president of Harvard) headed the Committee of Ten on Secondary Studies of the National Education Association. This committee was charged with smoothing the transition between secondary and college education. His committee proposed four courses of study for college admission: classical, Latin-scientific, modern languages, and English. However, by the beginning of this century, the influx of immigrants and inclusion in schools of students who were not college-bound increased the pressure on schools to do more than provide a precollege education. Businesses wanted more productive and literate workers. Labor was concerned about schools training workers. Debate intensified over education providing social mobility, not social control. Support for vocational education by both educators and industrialists also grew during the 1880s and 1890s, and the National Association of Manufacturing annually passed resolutions advocating vocational education. These movements culminated with the

Smith-Hughes Act in 1917, which provided federal support for vocational education.

4. Training on the job is not affected by high school curriculum or by observable and unobservable factors specific to the individual's high school (Altonji and Spletzer 1991).
5. Postsecondary educators also bemoan the lack of skills of students leaving high school, and remediation work conducted under the auspices of colleges has grown tremendously in the past decade.
6. See Koretz (1986, 1987, 1992) for trends and discussion.
7. Much of the discussion on the failures of urban high schools is drawn from McQuillan (1998), Montgomery and Rossi (1997), Burtless (1996), Lois and Miles (1990), Natriello, McDill, and Pallas (1990), and Boyer (1983).
8. The Latino category discussed here is a broader grouping than the Latino category used in later chapters.
9. This table presents results of probit estimations of High School and Beyond and the National Educational Longitudinal Study data sets. A full discussion of the data and methods used to obtain the results presented in Tables 1.2 and 1.3 is located in Appendix I.
10. The one exception is the coefficient on the academic track fell for high school graduation for Latinos.
11. The Five New Basics include four years of English, three years of mathematics, three years of science, three years of social studies, and one-half year of computer science, with two years of foreign language suggested for college-bound students. Similar conclusions were reached by the Carnegie Commission (Boyer 1983).
12. Goals 2000 established six goals to be achieved by the year 2000: 1) all children will be ready to learn before starting school; 2) at least 90 percent of students will graduate from high school; 3) all children will be competent in core subjects; 4) the United States will be first in the world in mathematics and science; 5) every adult will be literate and able to compete in the workforce; and 6) schools will be safe, disciplined, and drug-free. Perkins II reestablished the commitment to high-quality occupational education in high school and expanded the role that postsecondary institutions, particularly community colleges, play in curriculum development (e.g., U.S. Department of Education 1994a; Hayward and Benson 1993). The *School-to-Work Opportunities Act* integrated employment into academic learning by emphasizing a three-pronged program of work-based learning, school-based learning, and connecting activities.
13. These legislative efforts are consistent with the educational reforms outlined by educational scholars for urban schools with large portions of disadvantaged student populations (Natriello, McDill, and Pallas 1990).
14. Kazis (1993) provides a succinct yet in-depth overview of various school-to-work programs.
15. Co-op education is often part of a vocational education programs. Employers provide part-time jobs during the school year in the field of the student's vocational concentration. Because the teacher periodically visits the student at the

work site and the workplace supervisor evaluates the student's job performance, co-op education links work experience in a field closely related with a student's high school program. School-based enterprises apply classroom knowledge to real-world business problems by having students create and run their own business (Stern et al. 1994). Groups of students spend a portion of their school week providing services or goods for sale to the community as part of a small business that is operated within the school environment. Youth apprenticeship programs are often modeled on a modified version of the European training systems (Cappelli 1996; Hamilton 1990). These programs provide structured, nonuniversity routes to good careers by combining paid work and training on the job with related classroom instruction. Jobs are of progressively higher quality as the apprentice moves through the multiyear program and are tied to clear career ladders. Because both employers and educators develop the program, classroom instruction and workplace experiences are coordinated. Successful youth apprentices receive a certificate of mastery of occupational skills that is developed and recognized by firms across the industry in which they train.

16. Grubb et al. (1990) identified eight different styles of curriculum integration.
17. Tech prep programs represent a major thrust of Perkins II (Silverberg 1993; U.S. Department of Education 1993). These programs create a much closer link between secondary and community college programs than previously existed, and instruction is centered on teaching "all aspects of the industry" within a field (such as biotechnology). This contrasts with more traditional vocational education programs that build specific occupational skills. A tech prep education (akin to a "2 + 2 agreement") provides broad occupational training for a highly skilled technical occupation by integrating a four-year sequence of study that begins in the 11th grade in high school and extends through two years of postsecondary education. Most tech prep programs have "articulated" agreements between high schools and community colleges such that course work undertaken in high school is part of the program that leads toward the certificate or degree from the community college. This sequence of study often builds a student's competence in math, science, and communications and frequently results in a two-year associate's degree or a two-year certificate with technical preparation in at least one field.
18. The first career academy began in Philadelphia in 1969.

2

Our Approach and Methods

The district in this study adopted the general school-to-work approach to educational reform throughout its system and the career academy approach in high schools. These efforts began on a small scale in 1985, when the first career academy was established. The long-term commitment to these initiatives makes the district an ideal setting in which to assess the career academy's potential for several reasons. First, public school districts are political and bureaucratic institutions, and the possibility for the success of reform efforts must be studied within this environment. Public pressures and institutional inertia often inhibit changes of the magnitude sought in school-to-work programs.[1] These barriers may pose difficulties for career academies, which require a restructuring of traditional systems so that a "school-within-a-school" can be built. By studying the career academies within a single district that adopted this approach, we can examine the factors that impede and facilitate real-world implementation of the conceptual model.

Second, detailed longitudinal data on students in career academies are necessary in order to assess student outcomes, and this district has maintained such information on all students, including those in career academies. Aggregate statistics merely report program results and therefore cannot be used to evaluate individual situations. Databases of individuals with national randomized samples have too few students in nontraditional programs to permit evaluation of their effects. It is only where data are gathered from districts with comparatively large numbers of students in career academies over a relatively long period of time that both program level and student level outcomes can be judged. This is true for the district in our study.

Third, a process study of development and implementation requires program data on individual career academies and the school environment in which they operate. Because career academies in this district have been evaluated annually since 1990, over-time data on program characteristics are available. In addition, the heterogeneity of career academy programs in this district provides a unique opportunity to appraise different structures and avoids misstating potential by examining, for example, only well-established programs. Academies in our study vary in the extent to which they implemented the program model and in size, age, and degree of outside financial support. If the model is to be replicated as a reform effort, knowing why the differences arise among the career academies is as critical as understanding why variations occur in student outcomes.

Fourth, the potential of career academies to reform education must be assessed within the "real world" setting, and this district is typical of the inner-city public school environment. Because conclusions are drawn from controlled research settings, research restrictions that alter the environment (e.g., random assignment of students, selective inclusion of career academies into the sample) mean that an experimental study cannot describe and compare programs and outcomes as they are likely to occur in practice. Granted, the cost to our "real-world" assessment is some of the "rigor" of the analysis and precision in the estimates of program impacts. These conclusions are best drawn from more experimental research designs.

Our case study therefore examines the "real world" potential of career academies to solve the problems for which schools are criticized: low level of student achievement and failure to provide all students with the ability to succeed in postsecondary activities. We structure our evaluation of career academies at two levels. First, we ask the question, "Can career academies evolve to become the school-to-work educational reform strategy for urban, public districts?" We answer this with a qualitative evaluation of the career academies in the district.

Second, we ask the question, "How do the secondary and postsecondary outcomes of students from career academies differ from those of students who were not enrolled in academy programs?" We answer this with a quantitative evaluation of results that compares students from career academies with those from other programs. By combining a qualitative study of the nine career academy programs with a quantitative analysis of student behavior, we provide insights into both the operation of and outcomes from career academies. This approach allows us to better understand how programs affect students' post–high school experiences than if we examined only the individuals or only the institutions.

Because our evaluation of educational reform includes institutions and individuals, we employ a qualitative assessment of development and implementation at both the district and program levels and a quantitative assessment of individual student outcomes. In our qualitative assessment, we follow the district's effort to implement a uniform career academy model along with the development of nine unique career academies from 1990–1997. In this analysis, we uncover many necessary ingredients for promoting successful career academies as well as many impediments to their growth and implementation. Our quantitative assessment of individual student outcomes uses data from the population of high school students who were sophomores in the district's comprehensive high schools between 1990 and 1993. We followed this cohort of about 10,000 students through high school and through the first several years after high school. Because about 14 percent of these students were enrolled in career academies, our study is a rare opportunity to track a large population in such academies and to compare these individuals' high school and postsecondary experiences with those of their contemporaries who did not enroll in career academies.

In general, the qualitative analysis focuses on program development and implementation, while the quantitative analysis provides supporting analytic evidence. The quantitative analysis concentrates on student outcomes, with the qualitative data providing context for its conclusions. What follows is the general framework that is used in each analysis. Keep in mind that, although the discussion here presents fairly distinct qualitative and quantitative methods, the analysis undertaken reflects a blending of approaches.

OUR CASE STUDY COMMUNITY

The city and school district in this study have not been immune from the national trends that were outlined in Chapter 1.[2] Both the city government and the independent school district were concerned about public education and about the need to prepare the workforce for a rapidly changing labor market. Strategies to improve the quality of the public schools and to spur local economic development have long been the subject of intense debate and frequent experimentation. The city faced persistently low overall academic performance in its schools, despite implementing a plethora of reforms. Its once formidable industrial base had largely declined, and the neighboring communities, not the central city, attracted or incubated most of the high technology firms that are the centerpiece of the "new" economy.

The School District

The city's public education system typifies many of the circumstances and challenges faced by large urban school districts throughout the nation. The district serves over 50,000 students, with overall public school enrollment growing throughout the 1990s. Most of the city's (public) high school students are in the district's six comprehensive high schools. In the 1994–1995 academic year, these facilities varied considerably in size and configuration (Table 2.1). Three of the schools enrolled students in grades 9–12, while the other half served students in grades 10–12. The largest high school was nearly three times the size of the smallest high school. Graduating classes ranged from 61 to 464 pupils, a difference due to both entering class sizes and differential dropout rates.

More than 90 percent of the district's students were members of racial and ethnic "minorities" (Table 2.1). African Americans constituted at least half of the population at four of the six high schools. Asian students represented over half of the population at another high school, and African Americans and Latinos each comprised over 40 percent of the total at the final high school. Asian and Latino students were the fastest growing ethnic groups in the schools and were very diverse, ranging from middle-class Chinese Americans and Japanese Americans whose families had lived in the state for many generations to the children of recent refugees from Cambodia, Laos, and Vietnam. Similarly, Latino students included long-time residents and increasing numbers from not only Mexico but various countries of Central and South America.

Over one-quarter of the district's students were limited in English proficiency (Table 2.1), with at least 40 percent of students at two schools having limited English skills. Students at the same school often speak several dozen languages, and the challenges of bilingual education are compounded by this extreme diversity. Most of the public high school students are from lower income families, with high rates of reliance on welfare at all but one school. For the city's population, the family incomes of one in four youth were below the poverty line in 1995, and young people of color were seven times more likely than their white counterparts to be in families receiving public assistance.

Educational outcomes for the city's high school students would be considered inadequate by most standards (Table 2.1). In 1994–1995, yearly dropout rates stood at about 11 percent at two high schools. Standardized test scores showed poor academic achievement of the city students, with combined SAT scores ranging from 633 to 881 (784 for the district), well below the national average of 899. Students consistently fell near the bottom 25 percent of state test takers in reading, language, and mathematics, with mathematics scores slightly higher in most cases than reading and language scores.

Although city residents generally acknowledge that serious structural and socioeconomic challenges faced by their school system make it hard to achieve widespread academic excellence, they are vociferous in their expression that these generally low test scores, graduation rates, and rankings within the state are not acceptable. The academic achievement problems are compounded by major safety concerns, deteriorating facilities, tense labor relations, and a sometimes racially polarized political scene. This is not unlike many large inner-city school systems. The school system is, not surprisingly, in a continual state of ferment. Five successive superintendents in the past dozen years have enacted comprehensive reform strategies. In some instances, this has included major restructuring of high schools. Some of the innovations took root, while others did not outlast the chief executives' tenures.

The various citywide efforts at systemic educational reform have coexisted alongside a number of relatively successful pilot programs and improvements in teaching at individual schools. The district's career academies are generally seen as part of this latter trend. The academies grew steadily during more than a decade of districtwide unrest and are viewed by many administrators and community partners

Table 2.1 School, Student, and Faculty Characteristics by High School

Characteristic	HS1 (9–12)	HS2 (10–12)	HS3 (9–12)	HS4 (10–12)	HS5 (9–12)	HS6 (10–12)	District (K–12)
School size							
Number of students	1,327	1,465	630	1,646	1,413	1,835	50,180
Number of graduates	156	354	61	464	250	461	1,787
Student race/ethnicity[a] (%)							
White	0	1	1	2	4	16	7
African American	83	42	89	33	67	50	53
Latino	12	42	4	11	6	7	18
Asian	4	15	6	53	23	27	20
Other	0	1	0	0	0	1	2
Student background[b] (%)							
Limited English proficiency	13	40	6	45	17	14	26
AFDC	95	79	93	56	52	4	50
Free or reduced lunch	51	43	57	50	49	18	59
Yearly dropout rate (%)							
1991–92	10.9	11.5	9.2	4.2	3.7	5.1	7.9
1993–94	6.0	18.2	14.8	2.9	7.5	1.5	8.0
SAT score[c]							
Students taking test	68	122	23	160	139	306	824
Verbal	309	283	297	332	355	409	354

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Math	360	350	353	434	450	472	430
10th grade test score[c]							
Reading	22	22	26	26	36	NA[e]	25
Language	21	21	22	32	35	NA	25
Math	27	31	23	52	40	NA	34

SOURCE: Data are from public sources from the school district for the 1994–95 school year. Privacy dictates that we not provide full citations.

[a] Values may not sum to 100% due to rounding.

[b] The state defines "comparison groups" for schools that are similar in terms of school enrollment, percent of students' families on Aid to Families with Dependent Children (AFDC), percent of students eligible for free or reduced meals, percent of students with limited proficiency in English, and attrition. According to these criteria, all schools but HS6 are in the 90th percentile with respect to percent AFDC; HS2 and HS4 are in the 90th percentile in students with limited English proficiency; and HS3 is in the 90th percentile in students eligible for free or reduced lunch.

[c] The SAT score is the Scholastic Aptitude Test that is required by many colleges and universities for admission. The scaled score is reported. The national average for the SAT is 423 on the verbal and 476 on the math portions of the test.

[d] The score is from the norm-referenced test that is administered districtwide in the spring to monitor basic skills performance. The test is given to all students at grades 3, 6, and 9. It is also administered in all grades in schools that receive Compensatory Education Programs (five of the six high shools) funds so as to meet state and federal requirements for program evaluation. Scores are reported in percentiles.

[e] NA = not available (test scores were not released for HS6).

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as some of the district's most stable and useful innovations. At the time of this study (1990–1997), nine academies, each in a different career field, were in place. They are commonly identified as the Computer Science, Trade and Transportation, Media, Business, Law, Visual Arts, Performing Arts, Engineering, and Health academies.

The City

The school district serves a population that has faced many of the economic and labor market transformations that were outlined in Chapter 1. The city is the governmental and economic hub of a two-county area that comprises about one-third of one of the largest metropolitan regions in the nation. The city's population is nearly 18 percent of that of the consolidated metropolitan statistical area (CMSA). The 1990 census revealed that the city was one of the most ethnically diverse in the nation—43.9 percent African American, 20.1 percent Caucasian, 14.9 percent Asian/Pacific Islander, and 20.7 percent Latino. In 1990, the median household income for the city as a whole was about $27,000, and its poverty rate stood at just under 20 percent, compared to $30,056 and 10 percent for the nation's metropolitan population. However, 8 of 104 census tracts had a poverty rate of over 35 percent, and another 7 tracts had poverty rates ranging from 25 to 35 percent.

The city's traditional manufacturing base has substantially eroded, and with that loss have gone many of the better-paying, stable, blue-collar jobs. New jobs have been created roughly in numbers equivalent to those lost over the last decade, but the new positions are primarily in business services, government, telecommunications, and finance. These opportunities are bifurcated into very low-paying, often contingent, labor positions and high-paying, highly skilled professional positions, with a relatively small middle income group. Today, as has been the case since the post–World War II boom, a majority of the better jobs are filled by individuals commuting from the suburbs or from the affluent communities in the hills, an area serviced by one public high school and several private schools.

In spite of the rough economic transition and persistently high unemployment, the city is not without many economic advantages and potential for development. The immediate metropolitan area provides substantial and growing new industries, in part because of the proliferation of institutions of higher education in and adjacent to the city. In fact, within the region, much of the recovery from the 1990–1995 recession was due to the exceptional growth of knowledge-intensive industries. The region has led comparable areas in key indicators of success for growth in knowledge-based industries: the largest proportion of the population with college and advanced degrees, more highly rated research centers, more than double the average number of patents per employee, the highest level of high-tech exports, and three times the commercial Internet domains of other comparable communities. The region also has the highest number of top-ranked graduate programs in the nation for science, math, and engineering.

QUALITATIVE ANALYSIS

Our qualitative framework is grounded in the reporting that was done for the evaluation of the academies on behalf of the city government (see Chapter 3).[3] These reports were circulated locally for several years, and the findings were subjected to extensive feedback and recommendations from teachers, administrators, community partners, funding sources, and local policymakers. For this study, a new round of feedback sessions with teachers was undertaken midway through our analysis to ensure that their sense of the reality of working in an academy was captured.

Analysis Framework

The city government provided targeted funds to the school district for academies, and the performance-based contract governing these funds required an annual independent evaluation. Because these yearly appraisals overlapped the period during which our population of students was in high school, its findings and data can be used to determine the program's evolution over five school years. Evaluation occured at two levels: program and district.

At the program level, aggregate student outcomes from each career academy were compared annually against city-mandated benchmarks in several areas: academic achievement, program enrollment and retention, attendance, and graduation.[4] We expected that academy outcomes would improve as an academy matures, develops its programs, and gains resources. Where outcomes did not progress or meet city-mandated benchmarks, site visits and interviews with academy directors, principals, district personnel, and community partners helped identify problem areas. By tracing the evolution of career academies through the eyes of students, teachers, and administrators, and by tracking the changes that occurred in the outcomes, management, and structure as the districtwide program expanded, we assessed its viability and utility. The yearly evaluation also included indicators of the management of individual programs, such as curriculum, master schedules in the school, requisitions, schedules of field trips and speakers, and assignment of mentors. Each year, there was documentation of the progress in meeting city- and district-set objectives in these areas and of the factors that may have enhanced or inhibited timely and effective implementation. This gives us a sense of the degree of institutionalization that occurred.

At the district level, the program objectives set by the city and district also specified several important steps for developing academies' curriculum, undertaking long-range planning, and generating community support. These goals included securing of other funding and in-kind resources and expanding the academies' program throughout the district. Each year the evaluation analyzed the extent to which the new programs were instituted according to the model and noted examples of effective implementation as well as possible barriers. In all cases, the approach taken was not to create a single "grade" or summary judgment about the new materials and institutional arrangements but to work with the district and the city to develop criteria against which progress could be measured from all parties' perspectives. Three levels of assessment of the district's progress toward meeting these objectives were undertaken:

1) Timely progress: Were the tasks specified by the objectives completed on schedule, or if not, were there documented conditions as to the impediments to the timely completion of the tasks?

2) Quality and effectiveness: How well did the new plans and materials meet the needs of the students, teachers, and administrators? How much new support was created for the academies within each high school, in the district administration, and in the community?

3) Change: How did the most recent years' outcomes compare to those of previous years?

Qualitative Data Sources

The complexity of developing, implementing, and administering a career academy—a school-within-a-school within a districtwide bureaucracy—is daunting. Many requirements of the career academy model are difficult to accommodate within the traditional school framework. To determine whether each career academy is institutionalized within the school, or is at least moving in this direction, we assessed a large array of data. During our annual evaluations, we conducted dozens of visits to school sites, attended training meetings, conferences, and staff meetings, and conducted numerous formal interviews and had informal conversations with teachers, administrators, community partners, local policymakers, funding sources, providers of technical assistance, and students. Each year we conducted the work experience surveys, in which we asked interns and supervisors for feedback on work-based learning. We draw on these data sources for the qualitative analysis of career academies.

Local evaluation files

The local evaluation files contain data in two primary areas: administration and management, and academy development. The data are valuable for conveying not only the characteristics of the academies and their evolution over time, but also the differences that can arise between a program specified on paper and the actual program that the students experienced.

Administration and management. In addition to the qualitative information gathered from site visits and interviews, we developed measures of institutional capacity. For each academy and at the district level, this includes the number and quality of work placements made by industry liaisons, the advisory committee's scope and level of activity, the compliance with scheduling requirements, the completion of curriculum documents, the number of students enrolled, and other program elements.

Academy development. We have fairly extensive information on the availability and use of the academies' curriculum. Annual scheduling information of all classes offered in the district allows for yearly comparisons of the availability of and enrollment in "academy" designated courses. For example, the composition of the teaching teams in each career academy gives us the degree of staff continuity or, conversely, the rate of staff turnover. The proportion of enrollment targets attained, in terms of students admitted into the program and the enrollment of the students in the designated courses, gives us insights into the academy's growth.

Additionally, in 1992–1993 and 1993–1994, an extensive examination of eight of the nine career academies' curriculum was undertaken. Teachers were assigned to prepare curriculum guides following the district's prescribed format. The format required three sections for each curriculum guide: program materials, course materials by grade level, and integrated projects. The program materials included sections on the overall philosophy behind each career academy program. Additionally, curriculum guides were to include materials for every academy course at each grade level (10th, 11th, 12th). Finally, each career academy was asked to develop projects that integrated the academy courses and the career themes. The school district administration expected at least three integrated projects for each grade level by the summer of 1994, the point at which the measurements of completed work were taken.[5]

Work experience surveys

As part of the city's evaluation effort, yearly surveys were administered to the student interns and their intern supervisor and, in two of the years, to students' mentors. The set of surveys of interns had the highest response rates (Table 2.2).[6] This instrument included basic information about the internship (e.g., the industry, occupation, work hours, and relationship to respondents' career goals), the availability of training, an assessment of skills used on the job (reading, math, writing—both use and level), the quality of the job as a learning experience (e.g., their interest level, use of abilities, development of skills), the relationship of this work to school, and a comparison of this internship to other employment the individuals may have had.

Table 2.2 Response Rates for Workplace Experience Surveys (%)

School year	Supervisor	Internship	Mentor[a]
1990–91	—[b]	88.1	—
1991–92	55.2	79.3	—
1992–93	54.5	65.5	25.8
1993–94	44.5	66.4	23.3
1994–95	45.9	64.2	—
1995–96	43.1	60.3	—

[a] Approximately 41 percent of the mentor survey respondents in 1992–93 and 19 percent of the mentor survey respondents in 1993–94 reported that they had not actually been a mentor of an academy student.

[b] A dash indicates that a survey was not administered in that year.

Parallel surveys were administered to each intern's supervisor, although response rates were lower (Table 2.2). That survey asked about the supervisor's relationship to the student, interactions with district personnel, the supervisor's assessment of skills used (reading, math, writing, computers—both use and level), and a comparison of the student to other students and employees. Finally, for two years (1992–1993 and 1993–1994) a small percentage of mentors assigned to the students were surveyed. Mentor surveys included information on the type of interactions (e.g., activities, counseling), possible outcomes of mentoring (e.g., personality, educational change in student), and the mentors' satisfaction with the program, training, and experiences. While the surveys of mentors further our understanding of the program, the low response rate and the relatively low percentage of students who had mentors (about 25 percent) preclude its analysis.

QUANTITATIVE ANALYSIS

Our quantitative analysis examined the career academy's influence on 1) knowledge and skills acquired in high school, 2) postsecondary education, and 3) work outcomes at a point about two years after high school. We estimated value-added educational production functions that specify knowledge and skills taken from high school (e.g., Hanushek 1986) as determined by career academy enrollment, initial knowledge and skills, and controls. In other words, educational outcomes are modeled as a function of inputs into the process.

We distinguish between the youth and adult labor markets when modeling postsecondary outcomes. In contrast to adults, young people move frequently within and between work and educational experiences. This transition means that traditional human capital models do not always predict youth activities. Instead, education and labor market outcomes during the first two or three years after high school often result from high school experiences and demographics, including family background. This is reflected in all of our analyses.

While the key independent variable designates whether a student was in a career academy,[7] it is necessary for us to include controls for race (e.g., D'Amico and Maxwell 1994; Santos and Seitz 1992) and gender (e.g., Lynch 1989; Corcoran 1982) because education and labor market outcomes vary along these lines. Our estimations also control for limited English proficiency and enrollment in special education, because of the (presumed) lower levels of productivity that these characteristics hold. Perhaps most importantly, our analyses control for initial period knowledge and skills. In estimations of outcomes from high school, we use the standardized achievement score in the sophomore year to measure initial period knowledge. In estimations of postsecondary outcomes, we use the high school grade point average (GPA) when the student left high school to measure initial period skills. Controlling for initial period skills is extremely important because it is often correlated with program outcomes (e.g., high school program, pursuing postsecondary education) that affect outcomes. As a result, their omission as control measures can bias estimates of program impacts (e.g., Meyer 1996).

All multivariate equations in our study were estimated under three different sets of specifications: 1) using a binary variable to indicate a student's enrollment in a career academy, 2) using a vector of binary variables to indicate a student's enrollment in a specific career academy, and 3) stratifying equations by school, student's entering test scores, or level of academy course work. These alternative specifications allow us to assess the 1) aggregate impact of the career academy approach, 2) the effect of each specific academy, and 3) the impact of the career academy within the same school environment, for students with relatively equivalent levels of preparation, and for the amount of the academy's curriculum taken.

Knowledge and Skills Acquired in High School

We first examine whether career academies increase knowledge and skills taken from high school. Because achievement tests were not administered to all students in the 12th grade, we use GPA to measure knowledge and skills taken from high school.[8] This application of GPA draws two potential criticisms, however. First, career academy teachers could have different grading standards from the school as a whole. In this case, GPA, as a knowledge and skill measure, is invalid if career academies artificially increased a student's GPA. To analyze this possibility, we compared grades in academy and in equivalent non-academy courses. As Table 2.3 shows, with the exception of the Health, Law, and Business academies, there is no evidence that the career academies grade on a higher standard from the rest of the school. Only in these academies are there more instances in which the GPA in academy courses exceeds the GPA in nonacademy courses. The increase in GPA given in academy courses is exceeded by the increase in nonacademy courses (marginal GPA increase), suggesting that the net effect might be to lower overall GPA. In the Law, Health, and Media academies, over half of the courses within academies had higher grades than courses outside the academy in the same subject area. However, for the Media Academy, the marginal increase in grades is much higher in the nonacademy courses, suggesting that the net effect might be to lower overall GPA. This, in all but the Health and Law academies, analysis suggests that grades in career academy courses are lower than grades in comparable courses offered outside of the career academy.[9]

Second, schools could attach a different value to the same grade. Although relative homogeneity exists among the schools in our sample as compared with samples that have schools from different districts, heterogeneity in grading standards could still exist. To control for this potential, we use the individual's GPA subtracted from the school average GPA as our dependent variable. Because this measure captures the career academy's impact (for example) on raising GPA (knowledge

Table 2.3 Assessment of Differential Grading between Courses within and outside the Career Academies

Course area grading characteristic	Non-academy	HS3[a]		HS1		HS2	HS5		HS4	HS6
		Business	Law	Computer	Transportation[b]	Media	Engineering	Health	Visual Arts	Performing Arts
Grade comparison[c]										
Art	Non	—[d]	—	—	—	—	—	—	Non	—
Business	Non	Acad	—	Acad	—	—	—	—	—	—
English	Non	Non	Non	Non	Non	Acad	Non	Acad	Non	Non
Math	Non	—	—	—	Non	—	Non	Non	—	—
Nondepartment	Non	Acad	Acad	—	Non	—	—	—	—	—
ROP[e]	Non	Non	Non	Non	—	—	Non	—	—	—
Science	Acad	Acad	Acad	Non	Non	Non	Non	Acad	—	—
Social science	Non	—	Acad	Non	Non	Non	Non	Acad	Acad	Non
Marginal GPA increase[f]										
GPA difference, academy course increase	—	0.05	0.12	0.04	0	0.03	0	0.09	0.16	0
GPA difference, nonacademy course increase	—	0.19	0.06	0.37	0.29	0.23	0.40	0.07	0.02	0.56
Academy courses with higher grades than non-academy courses (%)[g]	—	25.2	55.1	18.4	0	55.2	0	84.5	21.1	0

[a] High schools are listed in order of the socioeconomic status of its service area, with HS3 drawing from the lowest socioeconomic area and HS6 drawing from the highest. Data were drawn from the transcripts of students in our three cohorts (1990–97).

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[b] Formally known as the International Trade and Transportation Academy.

[c] The table illustrates the areas of differences in grading between academy and nonacademy courses. A "Non" indicates an area in which grades given in the nonacademy courses are higher than those given in the academy courses. "Acad" indicates an area in which grades given in academy courses are higher than those given in nonacademy courses.

[d] A dash indicates that the sample was not sufficient for computations (at least 25 students must have both academy and nonacademy courses in a particular area).

[e] ROP = regional occupational program.

[f] The marginal GPA increase is the increase in students' GPA that would occur if courses were taken in areas in which 1) academy courses had higher grades than nonacademy courses (GPA difference, academy course increase) or 2) nonacademy courses gave higher grades (GPA difference, nonacademy course increase). This is computed as

$$\text{GPADiff} = \frac{\sum_{\text{Art}}^{\text{Soc. Sci}} ((\overline{X}_i^{a} - \overline{X}_i^{a'}) \times \#\text{Course}_i)}{\text{TotalCourses}}$$

where

GPADiff = the weighted GPA difference,
X = GPA in subject area *i*,
i = an individual subject area,
a = academy or nonacademy,
a' = the opposite of *a*,
$\#\text{Course}_i$ = the average number of academy courses taken in *i*, and
TotalCourses = the average number of academy courses taken.

[g] Percentage of courses within the career academy in which grades were higher than the grades given in the same subject area taught outside the career academy.

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and skills) above the school's average, it controls for different grading and achievement that may exist among the schools.

Our value-added educational production function that links knowledge at the time the student leaves high school with career academy program enrollment is therefore specified as

Eq. 2.1 $$\mathrm{GPA}_i - \overline{\mathrm{GPA}}_{\mathrm{school}} = \alpha_0 + \alpha_1 \mathrm{Acad} + \alpha_2 \mathrm{Demo} + \alpha_3\, \mathrm{K\&S}$$

where

$\mathrm{GPA}_i - \overline{\mathrm{GPA}}_{\mathrm{school}}$ = the individual's grade point average minus the mean grade point average at the school,
Acad = variables indicating career academy enrollment, in aggregate or in specific academies,
Demo = a vector of demographic variables that controls for the respondent's gender, race/ethnicity, English proficiency, and special education status,
K&S = a vector of variables that measures the respondent's academic achievement in the 10th grade,[10] and
α = the estimated coefficient.

Because the dependent variable is constructed as a deviation from the school mean, estimation of this equation answers the question, "Does the career academy program increase GPA above the average of the school?" We use ordinary least squares (OLS) to estimate the equation. Significant and positive coefficients on the career academy variables ($\alpha_1 > 0$) with the inclusion of all control variables suggest that career academy enrollment increases the academic skills taken from high school.

In Eq. 2.1, career academy students are compared to all nonacademy students in the district. When equations are stratified, different comparisons are made. Stratification by school shows how career academy students compare with nonacademy students in their school. This controls for many of the unobservable environmental factors that could bias estimations. Stratification by entering test scores compares career academy students with nonacademy students who have the same level of academic achievement when they enter high school. This controls for much of the unobservable individual heterogeneity in achievement that could bias estimations. Finally, stratification by academy course work shows how career academy students fare with different levels of academy "treatment."

Postsecondary Education

To assess whether the career academy increases postsecondary education, we ask the question, "Does the career academy 1) directly increase postsecondary education and interest in lifelong learning or 2) indirectly increase both of these outcomes through academic skills acquired in high school?" To respond, we estimated educational production functions with the dependent variable measuring educational outcomes:

Eq. 2.2 $\text{Educ} = \beta_0 + \beta_1\text{Acad} + \beta_2\text{Demo} + \beta_3\text{GPA}$

where

Educ = educational human capital,
GPA = the individual's GPA when leaving high school, and
β = an estimated coefficient.

Educational human capital (Educ) consists of multiple measures of education. It first consists of cumulative measures that capture whether a student completed or is progressing toward a particular educational milestone: high school graduation, attending a two- or four-year college, and attending a four-year college only.[11] This analysis assesses the ability of the career academy (or high school program) to help individuals advance to the next level of education. The second set of dependent variables measures the respondent's perceived preparation for lifelong learning that the high school program afforded. Eq. 2.2 is modified to estimate workplace human capital built in high school by replacing the left-hand side of the equation measures of job preparation and inserting GPA on the right-hand side.

We use a series of probit analyses to estimate educational benchmarks and learning measures that are constructed as binary variables.[12] OLS produces inefficient estimates of program impacts in such cases. We use OLS to assess the effect of career academies on categorical lifelong learning measures. If the coefficients on the career academy variables are positive and significant ($\beta_1 > 0$), the career academy program increases education directly. If these coefficients are not significantly related to education ($\beta_1 = 0$) but do significantly raise academic skills in high school ($\alpha_1 > 0$ from Eq. 2.1), which in turn increase education ($\beta_1 > 0$), the impact of the career academy is indirect, and operates by increasing human capital in high school. Should indirect effects be present, we confirm their existence by reestimating Eq. 2.2 without GPA as a control. If career academies significantly lift educational outcomes indirectly by increasing knowledge and skills taken from high school, the coefficient on academies will be significant without inclusion of GPA and insignificant with its inclusion.

The difference between a direct or indirect effect could be important for the approach taken by, and outcomes expected from, school-to-work reforms. If career academies exert an indirect effect on postsecondary outcomes, such influence lies in their ability to increase students' knowledge and skills. The route to postsecondary success is through building academic abilities, and the career academy is a mechanism through which these abilities can be strengthened. Without increasing knowledge and skills, the career academy will not facilitate postsecondary success, unless direct effects exist. A direct effect, in this case, implies that the career academy helps bring about postsecondary outcomes through some mechanisms other than enhancing academic knowledge and skills. It could be, for example, that career academies increase the students' motivation or build job or education networks that ease the transition from high school into either work or postsecondary education. In either case, such impacts would be independent of acquiring academic skills in their own right.

Postsecondary Work Experience

We also examine the career academy's ability to increase positive labor market outcomes about two years after leaving high school. More specifically, we ask the question, "Does the career academy 1) directly increase postsecondary labor market outcomes or 2) indirectly increase outcomes through academic skills acquired in high school?" The employment outcomes of interest include hours worked and self-perceived workforce preparation. For hours worked and perceived workforce preparation we estimate

Eq. 2.3 $\text{Hrs} = \gamma_0 + \gamma_1\text{Acad} + \gamma_2\text{GPA} + \gamma_3\text{Demo} + \gamma_4\text{Grad} + \gamma_5\text{Enr}$

where
Hrs = the average numbers of hours that the respondent worked,
Grad = a binary variable indicating whether the respondent graduated from high school,
Enr = a binary variable indicating whether the respondent is enrolled in classes, and
γ = an estimated coefficient.

For estimations of wages, we include hours worked on the right-hand side to control for the impact of differential labor supply

Eq. 2.4 $\text{Wage} = \phi_0 + \phi_1\text{Acad} + \phi_2\text{GPA} + \phi_3\text{Demo} + \phi_4\text{Grad} + \phi_5 + \text{Enr} + \phi_6\text{Hrs}$

where
Hrs = hours worked,
Wage = the respondent's (log) hourly rate of pay, and
ϕ = an estimated coefficient.

Each of these estimations (2.3 and 2.4) assesses the ability of the career academy to increase labor market opportunities during the school-to-work transition period. We use probit analyses to estimate equations with binary measures of work force outcomes and OLS to assess the impact of career academies on hours worked, (log) wages, and categorical workplace preparation variables.

If the coefficients on the career academy variables are positive and significant ($\phi_1, \gamma_1 > 0$), the career academies increase labor market outcomes directly. If these coefficients are not significantly related to labor market outcomes ($\phi_1, \gamma_1 = 0$) but do significantly increase academic skills in high school ($\alpha_1 > 0$ from Eq. 2.1), which in turn increase work ($\phi_1, \gamma_1 > 0$), the career academy's impact is indirect, and operates by increasing human capital in high school.

Quantitative Data Sources

Our primary source of information for the quantitative analysis is known as the City Student Database (CSDB), which was constructed for this study. This database followed a cohort of 10,110 students who were sophomores in the city's public schools in 1990–1991,[13] 1991–1992, and 1992–1993. About 14 percent (1,407) of these students were enrolled in one of the district's nine career academies.[14] The remaining 8,703 students, who were never enrolled in a career academy, became our "nonacademy" comparison group. The years of analysis covered in this study allowed for some time to elapse for high school completion by spring 1996, when the post–high school survey was sent. Quantitative information about these students was collected from two sources: district data files and post–high school surveys.

District data files

This database uses two different sources: student transcripts and general district files. The transcript data are a complete census of course work taken in or transferred into the district by each student. Information includes, for each course taken, the year and month of enrollment, course number and title, course grade, and grade level of the student at the time that the course was taken. We used this information to construct the individual GPA and a curricular history that included career academy course work compiled at the end of each semester (fall, winter, and summer). Because a student's GPA is based on school records, we avoid biases that could result from individual reporting of grades (Maxwell and Lopus 1994). Data files were also constructed from each student's demographic file. The material includes the student's achievement test score in each year in school, attendance in each semester, gender, race, and school.[15] This information was linked to the transcript database with a unique identification number generated to prevent linkage with all other databases in the CSDB, a condition of the agreement to release the data for this study.

Post–high school surveys

Data on students' post–high school activities were obtained from a survey that was mailed to each of the 10,110 students for whom we had district files. The district provided names, addresses, and the first and last school attended, to enable this mailing. Confidentiality prevented using district data to identify career academy students. Instead, we identified career academy students in this mailing from the names in the local evaluation files.[16] The post–high school surveys were mailed to students at five high schools from May to October (with follow-ups lingering through December) of 1996, when former students were between one and three years out of high school if they had had an on-time graduation.[17]

Surveys were mailed to three "populations": academy students at five schools (N = 1,257), nonacademy students at five schools (N = 6,804), and the students at the high school for which academy student status was not available in the local evaluation files (N = 2,041).[18] The questionnaires that were sent to each population were almost identical, with all of the differences limited to the first page and reflecting specific differences in the respondents' high school program (see Appendix II). For example, only career academy students were asked about their internships and mentoring. In total, 1,228 surveys were returned, with 981 from nonacademy students, and 247 from academy students (Table 2.4). Response rates (also shown in Table 2.4) were higher for individuals in the academy sample.

We intentionally directed questions to what was referred to in the survey instrument only as the student's "high school program." The respondents' self-determination of high school program allowed us to ask identical questions of academy and nonacademy students and to have them provide answers about high school that did not presuppose (from us) participation in any specific program structure or curriculum. If the questions had been differently worded for each group (e.g., "high school programs" and "academy programs"), the responses might have reflected answers to different questions. For example, an academy student who wanted to focus on college-preparatory activities may have been dissatisfied with the high school program if the academy curriculum was not sufficiently scholarly. However, the student may have been satisfied with the academy experience overall because of its other qualities. The questionnaire allowed for responses covering both dimensions of the experience. The post–high school questions were structured around five types of information: post–high school educational outcomes; post–high school labor market information; expectations about education, the labor market and the city as a place to live;

Table 2.4 Survey Response and Hit Rates[a]

Survey variables	Total[b]	Nonacademy	Academy
Total number sent	10,102	8,845	1,257
Number returned	1,228	981	247
Number NFA (no forwarding address)[c]	2,442	2,238	204
Hit rate[d] (%)	12.2	11.1	19.7
Response rate (%)	16.0	14.8	23.5

[a] The designation of academy and school status reflects the type of survey that was sent to the individuals. For an estimated 1 percent of the sample, this designation is inconsistent with the designation in the transcript files. The discrepancy exists because of the suppression of names in the CSDB. For this reason, nonacademy surveys were sent to all students at HS6. Surveys to students from HS6 were modified to include career academy categories in the selection of the high school program. Appendix II provides copies of the survey sent to academy students and the first page of the other surveys. Surveys were sent in 1996.

[b] The total number of surveys "sent" does not include the 98 students for whom the district did not have addresses. The total number returned includes the 16 individuals who returned surveys too late to be matched with the transcript data. Nonacademy surveys were sent to all students at HS6, but the survey was modified (only) to include career academy categories in the item concerning selection of the high school program.

[c] NFAs include individuals considered to be permanently inaccessible for one of several reasons, including one post office return of the survey with a "no forwarding address," and individuals who are permanently unable to return a survey (e.g., deceased, severely retarded). Because each of these individuals was contacted at least twice, we consider the NFAs as unreachable. Individuals who are temporarily unable to respond to the survey (e.g., incarcerated) are considered nonrespondents.

[d] Hit rate is the percentage of surveys that were returned as a proportion of the total number sent out. Response rate is the percentage of surveys that were returned as a proportion of the total number that were received (i.e., after removing NFAs).

assessment of the high school and program; and general demographic information.[19] Respondents to the post–high school survey had their responses linked to their transcript and district files to create the CSDB.[20]

Of critical import are the questions used to measure the dependent variables on lifelong learning and workplace skills. In the survey, individuals were asked to indicate how well their high school education helped them to obtain 13 different work- and education-related types of knowledge and skills.[21] Respondents were given four options with which to rate the efficacy of their high school program: a great deal, somewhat, a little, or not at all. These measures were specifically designed to capture three sets of qualities: "workplace" skills, "education" skills, and "school-to-work" skills. We use the four "education" items to encompass the career academy's potential for building a capacity for lifelong learning and the "workplace" skills items to represent workforce preparation. Survey respondents were also asked if their high school program "was related to" their current or last job and how valuable their high school program was "in preparing you for" the current or last job. We use these questions to measure perceived workforce readiness.[22]

Potential estimation caveats

Our specification, modeling, and data use are compromises between alternatives that meet our evaluation goals and steps to minimize biases in parameter estimation. We examine potential issues and complications in estimations that our approach may present in order to more clearly define the limits of our analysis.

Case study. The idiosyncrasies that exist within any case study can produce conclusions applicable only to one environment. While this critique cannot be dismissed out of hand for any case study, we believe that our methodology appropriately evaluates programs for educational reform. The district and city portrayed in this study are typical of many inner cities and public schools throughout the country. They illustrate the obstacles facing reform efforts in any community by showing the political pressures and bureaucratic structures that exist. While there are specific pressures and structures, their general form is in no way unique.

Sample selection. The primary criticism of our quantitative analysis would lie in the nonrandom assignment of students into the academy programs. This issue arises because the "ideal" analysis of program outcomes is one in which "counterfactuals" are estimated. Outcomes from academy programs must be compared to those that would have existed for participants in the absence of the program. If counterfactual results are known, they could be compared to the actual ones that occurred under the career academies. This would assess the value of the academies. Of course, as with any study, counterfactuals are not known. Our work simply assumes that the results for nonacademy participants with the same background characteristics provide an estimate of counterfactual outcomes. While this is far from perfect, we believe that it best suits the goal of this study: to assess the potential of the career academies as a "real world" educational reform.

A typical method for quantifying counterfactual outcomes is the random assignment of individuals into control (i.e., nonacademy) and treatment (i.e., academy) programs. The control group provides an estimate of counterfactual outcomes. However, as we know, random assignment to programs is not a policy option in the "real world" of high schools. Thus, outcomes from such an experiment may or may not approximate those that will exist once the program is implemented. In an actual school district, students (or their parents) will be given a choice of programs, and this selection becomes endogenous to outcomes. The random assignment of students to control and treatment groups therefore will not reflect a potentially important dimension of choice that affects outcomes once the program is implemented.

Still, we must address the issue of sample selection even if our goal is to reflect "real world" circumstances. Without any controls for sample selection, our estimates of program outcomes would be distorted by differences in observed and unobserved characteristics of students in different programs. Our single-equation estimation of program outcomes without random assignment contains statistical controls for observed heterogeneity in students and implicit "controls" for unobserved heterogeneity. We checked for potential biases along observed heterogeneity lines by initially including controls for Heckman's (1979) sample selection in 1) choosing an academy program, 2) taking initial period achievement tests (knowledge and skill control), and 3) responding to the survey. However, λ was never significant and did not impact career academy coefficient estimates.

Our strongest control for unobserved heterogeneity lies in our initial period control for knowledge and skills. If the unobservables that increase educational outcomes in high school are capitalized into 10th grade test scores, our parameter estimates of program impact will not contain biases from unobservables. Our inclusion of initial period controls for knowledge and skills is akin to estimating a fixed effect model. This is a common technique employed to purge estimates from biases that result from unobserved heterogeneity. We note that our analysis stratified by student's initial academic knowledge also controls for unobserved heterogeneity by confining estimations to students with similar characteristics.

Multicollinearity. Our quantitative study relies on a value-added production function framework that models educational outcomes in terms of inputs and processes (Lau 1979). The career academy is the educational process of interest. While differences existed among schools within the district in the degree to which the career academy model was implemented (Chapter 3), the administrative adherence to the model caused curriculum components (e.g., integrated curriculum, internships) to be highly correlated.[23] This correlation precludes putting curriculum components directly into the parametric analysis. By confining our estimation to the binary measure of career academy (as outlined), we cannot assess the influence of individual components with our quantitative analysis. We rely on the qualitative data for this evaluation. Our modeling of the career academy educational process is therefore confined to the binary measures of enrollment in the individual career academies, which capture the totality of all embedded subprocesses. By using binary variables for individual academies, we also keep open the possibility that the whole is greater than the sum of its parts. That is, the career academy educational process can be implemented in a variety of ways. For example, a program could focus on integrating its curriculum while placing less emphasis on work-based learning or, conversely, could place relatively more stress on work-based activities.

We note that, in the nonstratified analyses, in which a single academy binary variable measures programs' impact, our estimates of the influence of the career academy may be biased downward because of the inclusion of academies with incomplete programs. Since the coefficient on the binary academy variable includes the impact of weak programs, its size may increase when fully implemented program models are evaluated. A downward bias may accurately measure the impact of the academy as it is likely to occur in the "real world," however. If political pressures and administrative structures influence the development and implementation of career academies—and our study suggests that they do—then estimates of outcomes for career academy students may reflect those that would occur in a situation where both complete and incomplete programs exist.

Instrumental variable. Modeling the outcomes of education is complicated by the mediating role of family background (e.g., Altonji and Dunn 1996). One common "solution" to this dilemma uses instrumental variables that are computed from estimations of family background to replace variables on the right-hand side of the equations. This reduced-form approach models as instruments the factors that we model as inputs to educational outcomes. In this way, the instruments reflect both the direct and indirect impacts of their predictors. We untangle these effects with a structural technique by using initial period knowledge and skills to capture both academic abilities at high school entrance and background factors. This implicitly assumes that the students' academic skills at high school entrance measure all background influences that would impact the knowledge and skills taken from high school.[24]

Error terms bias. Unobserved variables that are correlated with independent or dependent variables can bias coefficient estimates. In research using educational production functions, this problem exists because many of these unmeasured variables change systematically with school district (i.e., they reflect the environment surrounding the production). We minimize this type of bias because our single school district represents a comparatively homogeneous educational environment. Since pupil/teacher ratios, per-pupil expenditures, class sizes, and most policies and procedures are all relatively constant, the estimated educational benefits associated with career academies are less likely to reflect spurious correlation than are estimates from a data set containing multiple districts (Meyer 1996).

SUMMARY AND CONCLUSIONS

Our case study complements efforts to assess policy analysis of school-to-work programs (e.g., Hershey, Silverberg, and Haimson 1999; Pearce 1996; U.S. Department of Education 1994b; Light 1994) in two ways. First, our study analyzes the development and implementation of school-to-work programs. It informs educators and policymakers about the forces that can impede and facilitate successful program start-up and delivery. The career academy model could be a great theoretical construct that works under ideal conditions, but, if it cannot make it through the development and implementation phase in a large school district, theoretical elegance may not matter. Second, our study describes the impact of a specific school-to-work program within a real world context. It adds to the body of knowledge that assesses the potential of career academies for educational reform.

Two other major efforts have assessed the impact of career academies on secondary and postsecondary outcomes: the Policy Analysis for California Education (PACE) study of California State Partnership Academies in 1985–1988 and the ongoing Manpower Development and Research Corporation (MDRC) site evaluation of career academies. PACE appraised the first 10 State Partnership Academies in California (Stern 1988, 1989; Stern, Raby, and Dayton 1992; and Dayton et al. 1992). Data were collected on the academy students and on matched groups of similar nonacademy students.[25] The majority of statistical significance tests between the groups' outcomes favored the academy students (61 percent). Most notably, the dropout rate among the academy students was half that of their counterparts. Students' testimony about the program and the mentors' evaluation were extremely positive with respect to their attitudes toward school, and postsecondary articulation and employment rates were high. Calculated benefits exceeded calculated program costs by two to one.

Over a three-year period beginning with the 1994–1995 school year, the MDRC evaluated 1,953 students at 10 sites that operated high school career academies (Kemple and Rock 1996; Kemple 1997).[26] The students included in the study were the academy applicants at each site who were determined to be eligible and appropriate for program participation. Of these students, 1,064 were randomly assigned to the program group and admitted to the site's career academy in the study. The remaining 889 were randomly assigned to the control group. Each group was followed through its scheduled graduation from high school. Preliminary findings from the evaluation suggest that the academy model is flexible in meeting local needs and capacities; attracting large numbers of students representing a wide array of demographic and educational characteristics; reducing drop-out rates; and increasing attendance rates, credits earned toward graduation, preparation for postsecondary education, and on-time graduation for those most at risk to drop out. However, career academies did not change standardized math and reading scores relative to those of nonacademy students, and some students became less engaged in school (relative to their nonacademy counterparts) if they attended an academy that did not present well-integrated program components.

Both of these research and evaluation efforts analyze program outcomes under more stringent conditions than does our case study. While their rigor in research design yields more precise estimates of program impacts, our study illustrates actual circumstances in an urban school district. Each type of research and evaluation is necessary to gain full insights into the potential for career academies to improve educational outcomes. Taken together, the studies form a considerable body of knowledge about one school-to-work model. Because this model is being discussed, adopted, and implemented in school districts throughout the country, a wide variety of assessments of its components is needed to answer questions about the effectiveness of work-based educational reform.

Notes

1. This view is often advocated by those who believe in more market-based reforms. These individuals generally note the superior performance of private schools over public institutions in helping students acquire knowledge and skills. Such improvements, arguably, result from standards and production methods that are determined in the market and include vouchers, merit pay for teachers (e.g., Ballou and Podgursky 1997), incentives to sites for effective operation (e.g., Hanushek and Jorgenson 1996) or performance outcomes (e.g., Ladd 1996), and school choice (e.g., Rasell and Rothstein 1993; Chubb and Moe 1990). The question of whether a market-based system for high schools would result in wide consumer demand for school-to-work programs is an intriguing one.
2. As is true throughout this book, privacy prevents detailing many publicly available citations of the school district.
3. Although the career academy at one high school (HS6) was not part of the local evaluation effort during the years of this study, we constructed relevant data for the purposes of our research. Local evaluations tracked the development of this academy (albeit not at a detailed level) as a benchmark of how development might occur in the absence of city funding.
4. City-mandated benchmarks remained relatively unchanged during the period of this study.
5. Few academies turned in integrated curriculum project write-ups.
6. Because only 104 students who responded to our post–high school survey also had internship surveys, data from these files were used mainly to develop vari-

ables to describe work-based learning within each individual career academy and were not linked or used in the individual-level analysis.

7. The district defines career academy enrollment at "marking period two," approximately 12 weeks into the fall semester. There may be students that we defined as career academy students for whom the career academy program had minimal influence (e.g., students who were in the program only one semester). The inclusion of students who may have switched out of the career academy will understate the program's impact.
8. We use end-of-semester grades to compute GPA. This biases upward the student's GPA and biases downward the number of courses taken because courses that are dropped during the semester (often because the student is failing) are not part of the student's transcript.
9. Table 2.3 shows that only a relatively small percentage of courses within the career academies have higher grades than the nonacademy courses in the same area (the * on the table designates grades that are higher in academy courses. Although about 84 percent of the Health Academy and 55 percent of the Law and Media Academy courses have grades higher than courses outside the academy, at least 75 percent of the courses within two-thirds of the career academies have grades that are lower than nonacademy courses in the same area. Qualitative indicators also suggest that career academy courses are more difficult than equivalent nonacademy courses.
10. The 10th grade is the first time that a student can (officially) enroll in a career academy.
11. The individual who attended a four-year university is counted as having graduated from high school, having attended a two-year college or a four-year university, and having attended a four-year university only.
12. An ordered probit is not appropriate because individuals can be included on multiple outcomes.
13. Because computerized data files on student enrollment are not available from the 1990–1991 school year, sophomores in that year were extracted as 11th graders in 1991–1992. We are therefore missing students from this cohort who dropped out of school between 10th and 11th grade, which produces a slightly different sample for this "graduating" class. We note that, by drawing data from the 10th grade, we ignore students who have dropped out of school prior to the 10th grade. While this is consistent with analysis of high school programs that begin in the 10th grade, such as the academies, it is not consistent with a more global analysis of dropout prevention programs (for example) because all potential students are not included in the analysis.
14. For coding purposes, we examined the enrollment patterns for the 21 students who were enrolled in more than one career academy. Eighteen students had spent two years in one career academy and one year in another. In these cases, the student was coded as being in the career academy of longest enrollment. In the remaining three cases, the student was enrolled in a different career academy in

each of two years. These students were coded as being in the career academy of last enrollment.

15. In theory, district data files also include a reason for leaving school for individuals who did not graduate from high school. However, these data are unreliable and incomplete.
16. The *a priori* designation was mostly correct. For career academy students who returned surveys, 87.8 percent returned academy surveys, 2.2 percent returned on academy surveys. Ten percent of the surveys from academy students who were not sent "academy questionnaires" were from HS6, where *a priori* designation of academy status was not possible. For nonacademy students who returned surveys, 1.0 percent returned academy surveys, 67.9 percent returned nonacademy surveys, and 31.1 percent returned the remaining high school's surveys.
17. Only one student in the sample of respondents reported still being in high school. All individuals were contacted at least twice to solicit their response. Academy students were mailed surveys in mid May 1996, and nonacademy students were mailed surveys in June and the beginning of July. A second round of follow-up "reminder" surveys was mailed in late July and August to individuals who had not responded to the first survey or whose survey was returned by the post office as "undeliverable." Reminder postcards were sent in September to all individuals for whom a survey was returned as "undeliverable" in either round one or two of the mailings. We note that although 100 percent of these postcards should have been returned to us, only about 60 percent were returned and survey response increased after the postcards were mailed. Students from HS6 were mailed surveys in early November, with the follow-up "reminder" surveys mailed in mid December.
18. Legible names were not available for eight students. Because HS6 housed no career academies that received additional city funding, initially our study did not include students and academies in this school. However, additional funding allowed their inclusion, albeit in a separate mailing two months later.
19. The survey was designed to maintain as much overlap with the National Education Longitudinal Study (NELS) questions as possible. In fact, over half of the data items from our surveys had questions directly drawn from questions in the NELS.
20. Unfortunately, identification of students in the transcript data is not possible for those who did not provide consent (i.e., nonrespondents).
21. Of course, the accuracy of these measures is subject to their self-reported nature. In fact, our analysis implicitly assumes that students can correctly assess the program's ability to impact knowledge and skill acquisition. In other words, the assumption is that the errors in student assessment are randomly distributed with a mean of zero.
22. Respondents were coded 1 if they stated that their high school program was "very valuable" or "somewhat valuable" and 0 if their judgment was that it was "not valuable" in preparing them for the job.
23. While a factor analysis could determine the relative strength of each subprocess in facilitating desired outcomes, it cannot be undertaken because of insufficient

degrees of freedom. As a rule of thumb, a factor analysis must have four to five times the number of observations as variables to be analyzed for a successful rotation. Given the plethora of variables measuring career academy components (e.g., degree of curriculum integration, work-based learning, connecting activities; stability in teacher and student cohorts; program completeness) and only nine career academies, we have many more variables than observations.

24. Maxwell (1999) supports this assumption by showing that family background had little effect on the estimated marginal impacts of the high school program on academic knowledge and skills.
25. Matches were made on the student's demographics and past performance.
26. Criteria for inclusion in this study were rigidly set. For example, all academies must possess the defining structural elements of the model, a requirement that excluded programs in initial or partial stages of implementation. As a result, the participating programs were drawn from the established networks of academies across the nation. Only two of the academies were developed independently through local high school or district initiatives.

3

Developing a Local School-to-Work Program Model

The city and school district viewed school-to-work programs as a potential solution to education and economic development problems. Both entities reasoned that, in the short run, increasing the academic and workplace skills of the city's students in line with the needs of the labor market would lead to students being more readily hired and retained by local employers. Over a longer period of time, the city's economic base would expand as firms were attracted to a ready supply of appropriately educated workers. To meet these ends, the city and school district developed a model of support for school-to-work activities that coordinated the efforts of the school district, city, local colleges, business partners, and community-based organizations. In conjunction with this larger effort, the district conceived a career academy model that emphasized educational achievement. In this chapter, we outline the district's model and detail its components as they were intended. We then examine deviations from the model as it moved from the conceptual phase at the district's central office into operation at the high schools.

THE RISE OF THE CAREER ACADEMY MODEL AS THE CITY'S EDUCATIONAL REFORM

The commitment to school-to-work programs was codified as a citywide goal in 1991 when a community task force with nearly 1,000 participants developed a strategic plan of the city's future. A major goal of the task force plan, which was completed and adopted by the city council the following year, was "to coordinate education, job training and vocational efforts from childhood through adulthood, ensuring the most creative, effective and efficient use of public and private resources." The plan called for not only expanding the existing career academy program but also for creating new on-the-job training and apprenticeship sites for internships. The city would be a model for helping students make the transition from public secondary school and community colleges to the workplace. About the same time, the board of education also approved a five-year education plan that supported this vision and put the academy model at the center of the district's strategy for restructuring high schools.

When the city council, the school district, and the broader community (as represented by the task force) formally adopted the school-to-work approach as the centerpiece of youth work force development policy, no system of such programs was in place. Rather, several career academies had been operating for up to six years, a small central district office managed and assisted them, and plans to start several additional academies were on the table. Adopting the more ambitious plans, and the financial support that subsequently flowed to the program, reflected the ascendancy of the academy model into the local educational policy mainstream.

The Evolution of the Career Academies

The career academy program within the district grew out of small, home-grown innovations that were started by a number of teachers in the mid 1980s. In 1985, the program was launched with the establishment of the Health Academy (which later added "Biosciences" to its name and curriculum). Within four years, the Health Academy was joined by academies in Media, Computer Technology, Business and Finance, Engineering and Performing Arts (Table 3.1).

These early academies were highly distinctive, each the product of one or two teachers with particular visions and capacities. They shared a commitment to an "integrated curriculum" of academic and laboratory courses, although they carried out this integration in very different manners and to different degrees of completeness. They all incorporated aspects of contextual learning and built partnerships with employers and professional groups to give students work experience and exposure to the industries. The academies stressed the importance of higher education and sought to establish settings in which students would believe in their own abilities and draw support from their teachers and peers. Within this environment, students would achieve beyond what had previously been expected of them. In their early years, the academies gained an anecdotal reputation, nationally as well as locally, for success stories drawn from a heterogeneous group of students.

Some salient characteristics of the more thoroughly developed early academies were harbingers of the broader system that was later created. The Health Academy was known from the start for creating a strong network of social support for a very diverse group of students. This network was maintained, not only by keeping students in courses and extracurricular activities together over (ideally) their three years of high school, but also through the extra efforts of the core teachers, and the involvement of professionals, college students, alumni, union leaders, and a growing "extended family" of mentors and internship supervisors in health industry settings.

The Media Academy became well known for employing technology, collaborative work settings, and opportunities for creative expression and leadership offered by newspapers, magazines, radio and video. Students developed their literacy and writing skills, as well as their organizational skills and their understanding of how a workplace and enterprise function. The settings for this learning included both award-winning student publications and a network of internships at local media outlets.

The Engineering Academy was actually known as "Pre-engineering," a distinction that represented an important connotation of college preparatory work. It focused on integrating academic courses (physics and math) with vocational courses (drafting, including computer graphics). This curriculum was designed and carried out in a manner to produce students who could excel in college preparatory studies in sciences and engineering, even though they had not been previously on track to do so. The Engineering Academy later adopted a stronger focus on work experience, and carried out a partial integration of humanities courses, but these concerns were not as central as they were for the other academies.

The Business and Finance Academy began with a modest partnership with the local insurance industry association. This association provided resources for vocational simulations and internships, and these resources were leveraged as the full academy curriculum was adopted.

Table 3.1 The City Career Academies: Titles and Years of Operation

Academy	Year operation began[a]	Years of CRA funding[b]	Total 1994 enrollment (10–12)[c]
Academies in the study			
HS1			
1. Computer Science and Technology	1987	3	126
2. Transportation	1992	3	101
HS2			
3. Media Communications	1986	[illegible]	160
HS3			
4. Business and Finance	1986	5	85
5. Law and Government	1991	4	90
HS4			
6. Visual Arts	1992	3	87
HS5			
7. Engineering	1989	5	132
8. Health and Bioscience	1985	5	221
HS6			
9. Performing Arts	1989	0	85
Academies not in this study			
HS1			
10. Environmental Science and Natural Resources	1993	—	—
HS2			
11. Architecture Design and Construction	1993	—	—
HS5			
12. Computer Science and Technology	1996	—	—
HS6			
13. Future Teachers (Education)	1993	—	—
Additional academies opened			
HS1			
14. Arts and Entertainment	1997	—	—
15. Construction and Manufacturing Technology	1997	—	—

Academy	Year operation began[a]	Years of CRA funding[b]	Total 1994 enrollment (10–12)[c]
16. Culinary Arts and Food Science	1997	—	—
17. Fashion Design and Manufacturing	1997	—	—
18. Public Safety and Human Services	1997	—	—
HS2			
19. Arts and Education	1997	—	—
20. Business and Government	1997	—	—
21. Electronic Technology	1997	—	—
22. Health and Bioscience	1997	—	—
HS3			
23. Computer Science and Technology	1997	—	—
HS4			
24. Engineering	1997	—	—
25. Environmental Science and Natural Resources	1997	—	—
26. Media Communication	1998	—	—
27. Computer Science and Technology	1998	—	—
HS5			
28. Business	1997	—	—
29. Performing Arts	1998	—	—
30. Education	1998	—	—
HS6			
31. Architectural and Graphic Technology	1997	—	—
32. Computer Science and Technology	1998	—	—
33. Health and Bioscience	1998	—	—

[a] Year shown is for the beginning of the school year.

[b] Years of the City Redevelopment Agency (CRA) funding include funding through the 1994–1995 school year.

[c] Data on total enrollment are from the City Student Database (1990–1996).

These four academies received a boost in program support in 1990, when the city council, sitting as the city's redevelopment agency (CRA), appropriated $1.2 million for their expansion and enhancement over the coming year. Since the city and the school district are entirely separate, parallel government entities, there was no legal requirement that this support be provided, nor was there any standing budgetary relationship. Given the magnitude of the city's education problems, however, city council members were eager to find a way to address school improvement. The city council's action was a gesture to support a financially strapped school district by assisting one of its few positively regarded components and was a novel use of redevelopment funds to develop a technically trained workforce for the city's growth industries.

Through CRA help, the city-supported academies strengthened their curriculum with new equipment, stipends for student work internships, greater numbers of tutors, mentors and field trips, additional planning and curriculum time for teachers, and "industry liaisons" to recruit mentors and place students in internships. Although the maximum level of possible funding was set by the city council, the actual payments depended upon the program meeting benchmarks set in a contract between the city and the school district.[1]

The redevelopment agency's support was initially directed to four academies housed in four different schools, due to their strong connection to the demand for employees in their industries and professions within the city's central district redevelopment area.[2] The number of sites receiving this support expanded over the next four years as new academies were started and existing ones became more complete. By the 1994–1995 school year, the CRA funding supported eight academies and 1,102 students, an increase of 168 percent in students over the initial year. These academies were built along the career themes embodied in Visual Arts, Law and Government, Computer Technology, and International Trade and Transportation (Table 3.1). Another academy, Performing Arts, had operated since 1989, and began receiving CRA funding in 1995–1996. Several others were in the start-up process in the mid 1990s but only began receiving CRA support by 1996–1997. By 1994–1995, each of the six comprehensive high schools contained at least one career academy (Table 3.1). About 14 percent of all the public high school students were in career academies at that time

Table 3.2 Number of Academy and Nonacademy Students by School

Academy	Academy students	Nonacademy students	% of student body in academies
HS1	258	1,153	18.3
Computer	186		
Transportation	64		
HS2	206	2,070	9.1
Media	199		
HS3	259	255	50.4
Business	179		
Law	97		
HS4	97	2,050	4.5
Visual Arts	89		
HS5	408	950	30.0
Engineering	199		
Health	216		
HS6	169	2,071	7.5
Performing Arts	159		
N	1,397	8,549	14.0

[a] Data are from the City Student Database and reflect enrollment patterns of students in our three cohorts (sophomores in 1990–93). Some career academy students left a school that did not house a career academy or "their" academy. Nine career academy students were in academies that were not part of this study (seven were in the Environment Academy at HS1 and two were in the Architectural Academy at HS2).

(Table 3.2), although the proportion of the student body that was enrolled in academies varied among the six schools from 4.5 to 50.4 percent.

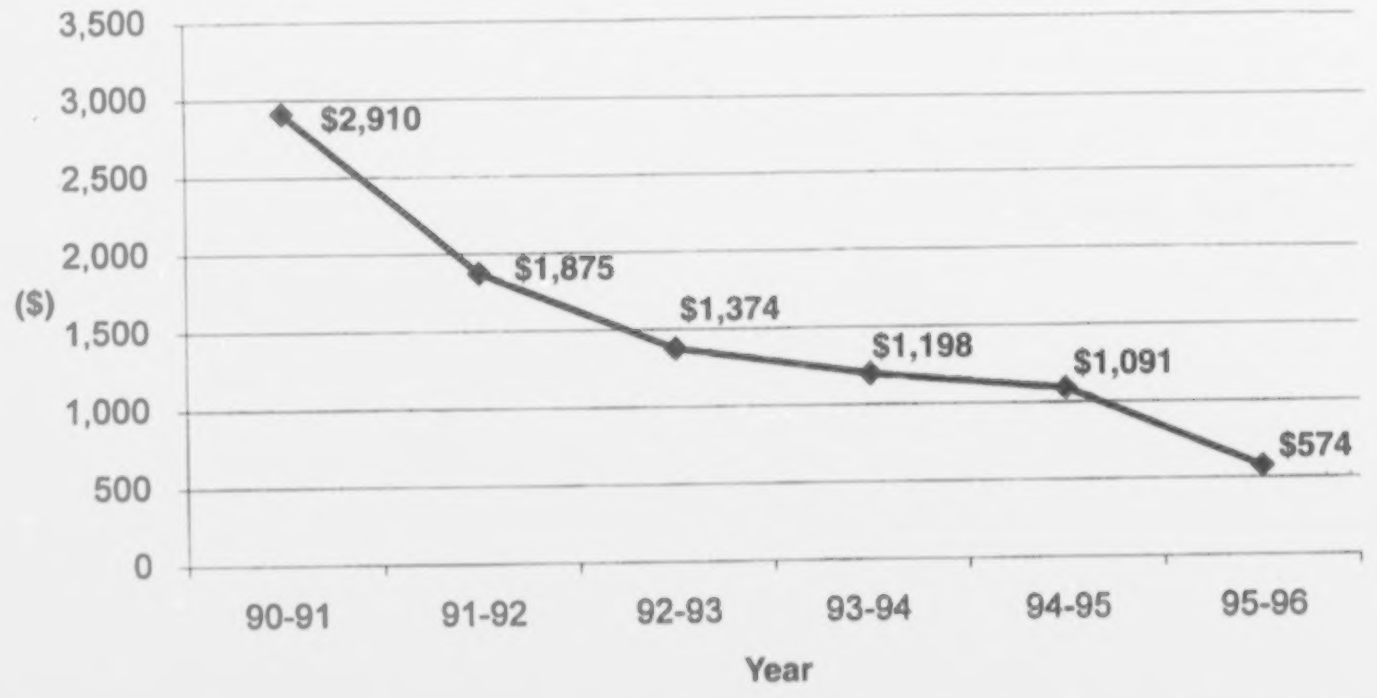
As might be expected, expanding to this number of programs and students was not a matter of simple, ready replication. As we saw in Chapter I, the full model of a career academy is an extensive package that calls for substantial new staff training and team building, community partnerships, alignment of key supporting management systems (such as schoolwide class and student scheduling), and acquisition of other resources. Valuable lessons were learned by the directors from the early implementation experiences, and adjustments to the model were made each year. However, even with agreement on the model and widespread political and administrative support, establishing the baseline components took several years for most of the sites, and some were still incomplete at the time of our data collection in the 1995–1996 school year.

As the number of students grew and the CRA allocation stayed constant or was reduced, the CRA dollars per student declined, from $2,910 in 1990–1991 to $574 in 1995–1996 (Figure 3.1). The uses of the CRA funding changed over time as well, as Figure 3.2 illustrates. In the early years, there was a heavy emphasis on supporting teachers' time for preparing and planning (57 percent of the dollar expenditures), for purchasing equipment (22 percent), and for paying the students' workplace stipends (20 percent). By the fourth and fifth years, much more CRA funding went for student stipends (44 percent), and by 1996–1997 the entire amount, even the small proportion dedicated to teachers and administrative functions, was dedicated to work-based learning. This reflected both the redevelopment agency's primary interest in supporting the work-based component, and the belief that over time the school district had completed its initial curriculum development and teacher preparation or had institutionalized other ways to finance those processes.

One form of institutionalization was embodied in the program's capacity to obtain funds from other sources. The school district's own budget picked up 53 percent of the total cost of the academy program over the 1993–1995 period (Figure 3.3A). This amounted to approximately the amount spent on the academy students for their basic education (e.g., basic teachers' salaries rather than any special allocation). The city's redevelopment monies accounted for 27 percent of the total funding for academies.

The one-fifth of total funding received from sources other than the school district and the CRA was roughly evenly divided among the state government, the federal government, local corporations, and another municipal government one-time source (Figure 3.3B).[3] The federal grants received during this period, whether to individual sites or to the district as a whole, were not entitlements for the school district. Rather, they were won as the result of intense national competitions in

Figure 3.1 Per-Student Redevelopment Monies Budgeted to Academies



NOTE: Numbers reflect the total amount of the CRA academies' budget for each year by the total number of students who were actually enrolled.

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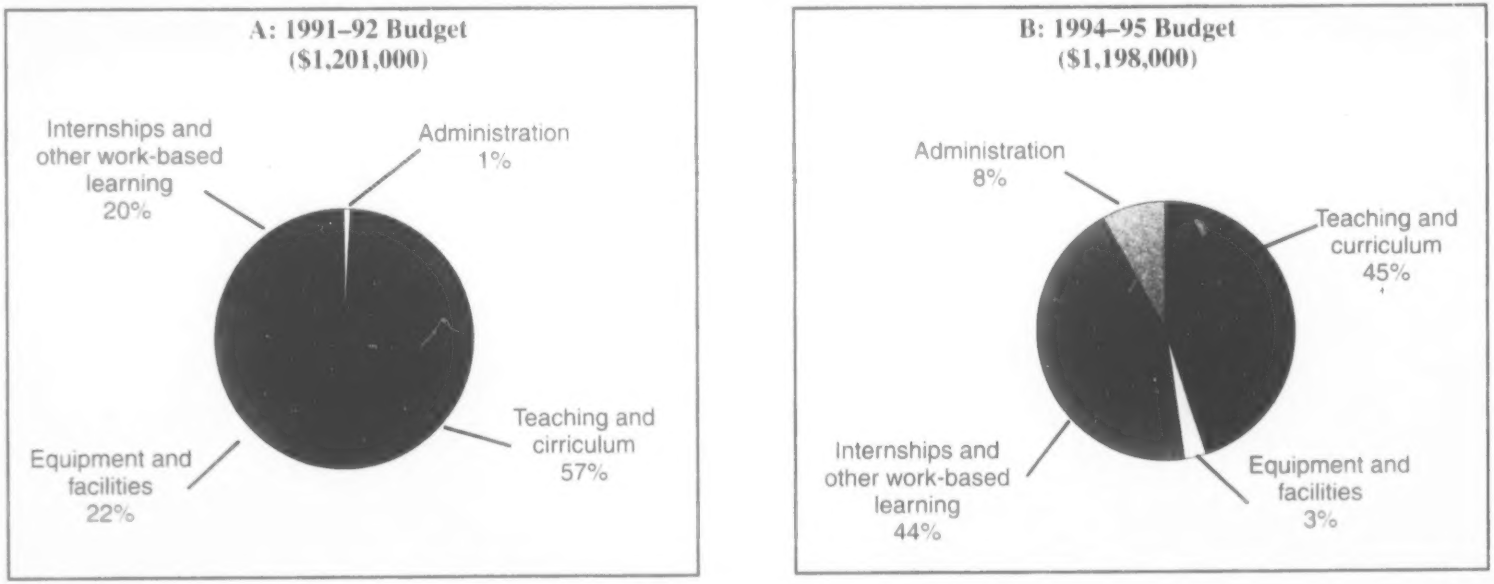
Figure 3.2 Change over Time in Allocation of Redevelopment Dollars to Academies



A: 1991–92 Budget ($1,201,000)

B: 1994–95 Budget ($1,198,000)

NOTE: Data are from contracts between the district and the city for each program year. The teaching and curriculum category includes certificated salary and benefits, teacher substitutes, in-service payments, instructional supplies, tutor benefits, and consultants. Equipment and facilities includes noninstructional supplies and equipment. Under internships and other work-based learning are student stipends, field trips, transportation, and industry liaisons. Administration includes printing and consultants.

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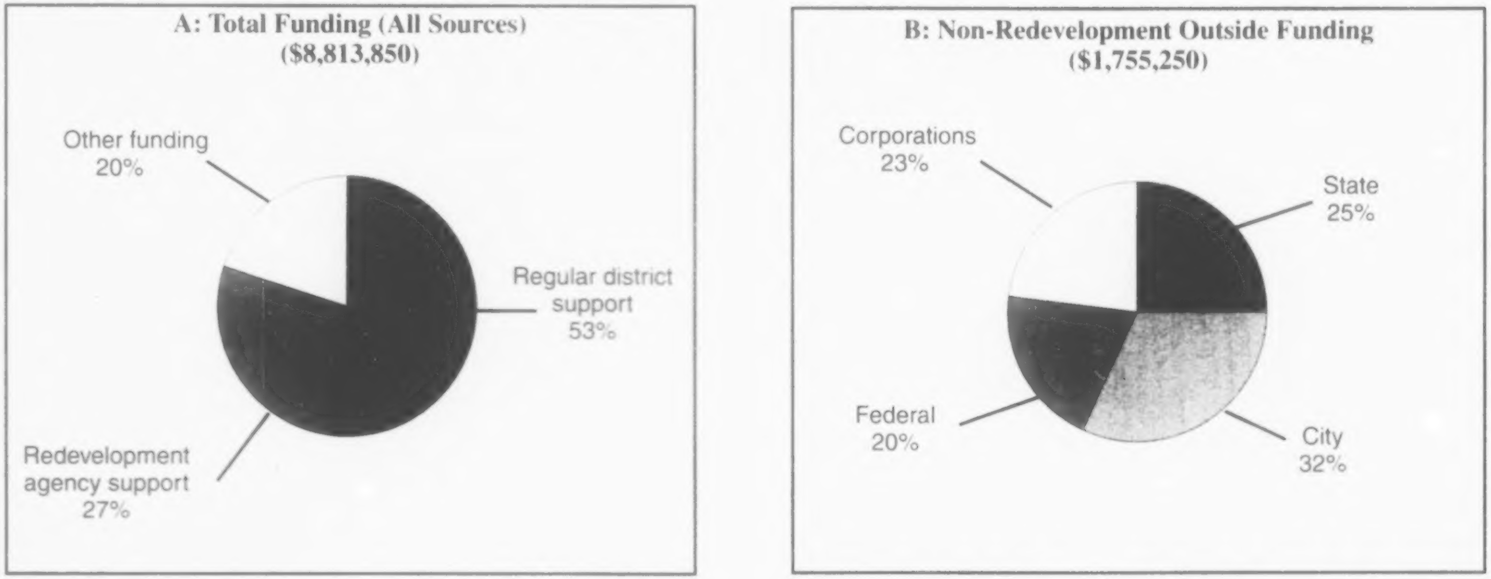
Figure 3.3 Funding Sources for Career Academies, 1993–1995



A: Total Funding (All Sources) ($8,813,850)

B: Non-Redevelopment Outside Funding ($1,755,250)

NOTE: Data are from contracts between the district and the city for each program year. Major sources of support include the following: state to the Health, Law and Media Academies ($135,000 each) for operating expenses, to the Media Academy for telecommunications ($20,000), and to the Health Academy for youth apprenticeships ($11,250); city funding to the Health Academy for a health clinic ($100,000) and to the Trade and Transportation Academy for an aviation mechanics shop ($472,000); federal funding to the Law Academy for law-related education ($93,000) and to the district for curriculum, skill standards, and employer partnerships ($250,000); and corporate support to the Engineering Academy for equipment, stipends, and program costs ($200,000), and to the Health Academy ($204,000 total).

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the early years of federal school-to-work grant programs, providing some validation of the stature of the career academies in the wider educational community. The academies also received substantial in-kind support from several national technical assistance centers in the school-to-work field, for curriculum development, parent and community involvement, use of technology, and student entrepreneurship.[4]

The outside monies and technical support gave district school-to-work administrators and career academy teachers an opportunity to develop a particular local vision of outcomes expected from their programs. This vision differed from the perception held in some other cities that school-to-work programs are modern versions of apprenticeships, or are training activities tightly articulated with entry-level employment. Many forces converged to create an educational focus for the city's career academies. Academy directors often measured success in terms of the students' overall preparation for higher education, work, and life, and not in terms of a career in the academy's profession. Also, CRA funding, which represented a large percentage of the marginal dollars received for academy support, created incentives for the outcomes in the school achievement benchmarks set by CRA funding to be internalized as program goals.

Despite the putative emphasis on employment in CRA performance standards, little pressure existed to orient the programs toward securing immediate jobs for graduates. The benchmarks that received the most attention focused on educational attainment, rather than on labor market outcomes. Educators, employers, and some city policymakers shared the understanding that the local labor market was moving rapidly toward a knowledge-based economy, one in which fewer higher-quality jobs would be open immediately to high school graduates. Finally, most of the academy's corporate partners encouraged students to get further training or education before employing them in the better jobs at their own firms. They were concerned enough with the longer-term employee "pipeline" to invest in its starting point, knowing that further education, specialized training, or work experience would precede hiring academy graduates. The result was that the career academy programs, especially the older, more established ones, became more heavily focused on postsecondary articulation than on successful labor market placements.

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This point of view was challenged, however. One city council member, a former corporate executive who had been a vocational student in high school, as well as some employers in the city's shrinking industrial district, expressed concerns that the positive heritage of vocational programs—their direct link to skilled trades—was being lost to an exclusive interest in increasing access to higher education. Operators of more job-focused youth training programs, perhaps envious of the repeated large contracts won by the academies in the name of economic development, expressed the sentiment that a wider range of programs was worthy of support. As one disenchanted former Engineering Academy student stated in response to the survey conducted as part of this study,

> The inflated value we have placed in academic education but not technical programs is taking its toll. The number of academics, planners, analysts, consultants, etc. among people of color, especially blacks, have increased, but the supply of skilled technicians and tradesworkers have decreased. The same inflated value placed on the jobs is internalized by these academic people who hold these jobs, creating big egos, while the technicians and tradesworkers also internalize the little value placed on their jobs.

Interestingly, this student dropped out of the Engineering Academy and enrolled in the Health Academy at the same school, which she found "much better . . . The staffs [*sic*] were more caring, since they gave the students a wider range of opportunities, but it was not sufficient to rekindle what was lost."

The critique of the academies' emphasis on higher education, particularly four-year college, appeared to be a minority viewpoint among policy makers and students, but it represents an important reminder of the various levels at which the labor market can be addressed and the challenges of serving a diverse population. In fact, most of the academies (although apparently not Engineering) were building closer relationships with the local community colleges to promote the movement of students through technician certification programs as well as to encourage readiness for university study.

Creating a School-to-Work System

The district's commitment to using the academies to implement an educationally focused school-to-work strategy is strong. Not coincidentally, this focus is consistent with the broader systemwide restructuring efforts that each of the last three superintendents had adopted since 1990. As a result, both the number of academies and the array of related career preparation activities for students have grown.

Beginning in 1994, district staff organized and received a federal grant to institutionalize "CommunityWorks" as the umbrella for school-to-work partnerships with employers and higher education. With this grant, the district committed itself to designing and implementing a coherent sequence of career-related programs for all students, by creating supportive structures and processes, and to the design, delivery, and evaluation of school-based and work-based learning. At the high school level, the CommunityWorks school-to-work system was "to provide a sequenced program of study that integrates academic and career-oriented curriculum and engages students in contextual and experiential learning so that they will:

- Select a career path cluster to explore in grade 10.
- Explore a range of career options within a career path cluster.
- Maintain a career portfolio that includes samples of their work and a school-to-career transition plan.
- Complete requirements for an employability skills certificate of mastery (certificate of initial mastery).
- Choose a career major by the end of grade 10.
- Complete requirements for a career cluster certificate of mastery.
- Complete requirements for selected occupational skill certificates.
- Complete requirements for graduation from high school and entrance into institutions of higher learning."

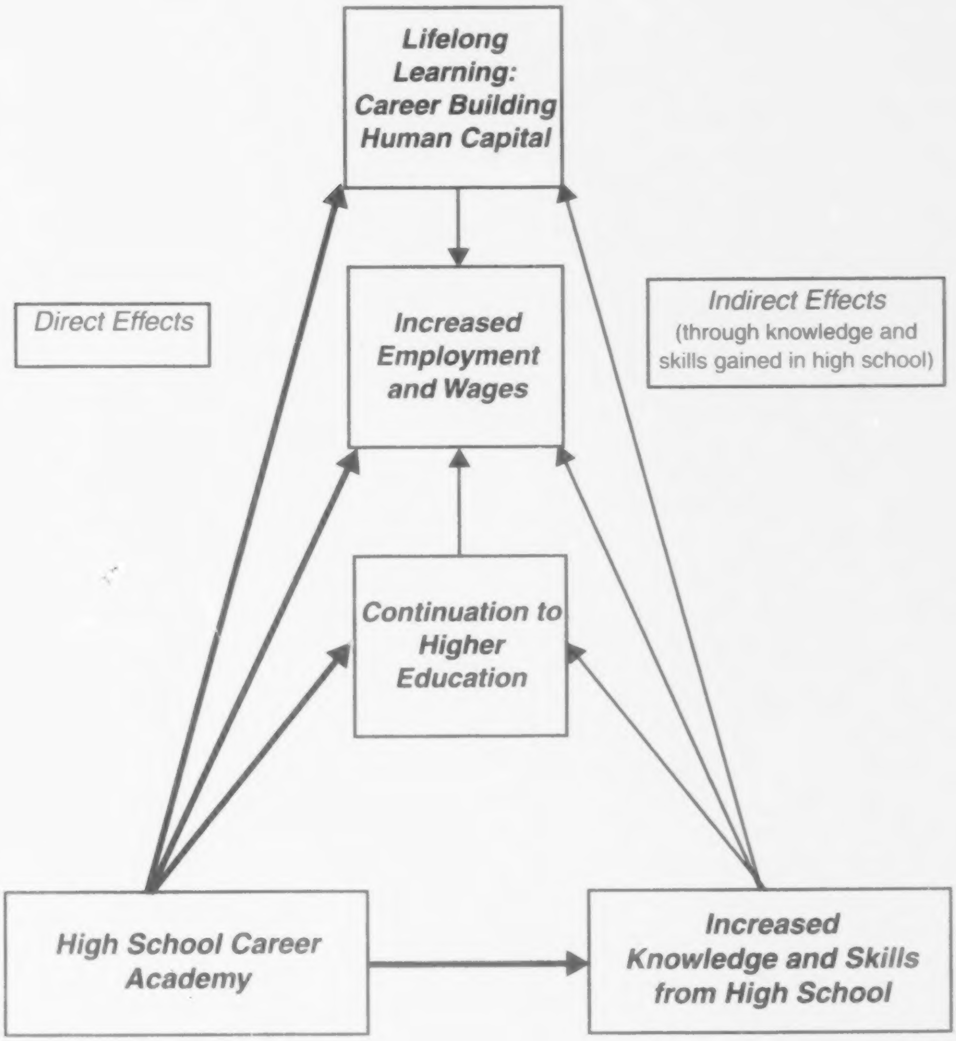
This is an outline for more than just the proliferation of discrete academies. It is the blueprint for a whole system. This expansion is intended to include the vast majority of 10th through 12th graders and could conceivably include all students.

THE CITY'S ACADEMY MODEL IN THEORY AND PRACTICE

The academies were the original and most fully articulated components of the school-to-work system in the schools. We can therefore characterize the program in a conceptual framework that is derived from the priorities of the academies' staffs and supporters. Figure 3.4 illustrates the anticipated outcomes from the career academies by the school district. The academies are expected to directly increase student's performance in four ways. First, the contextual learning environment within the academy is anticipated to raise the student's motivation to continue to higher schooling by demonstrating the necessity of education in today's labor market, and by increasing the student's understanding of the connection between academic content and the work itself. The arrow illustrating this path is estimated with Eq. 2.2 in Chapter 2, with educational benchmarks as the dependent variables. Second, the work-based learning component to the program and the emphasis on building workplace skills are expected to increase employment and wages for students as they enter the labor market. This path is estimated with equations Eq. 2.3 and Eq. 2.4 in Chapter 2, in which the academy's impact on employment and wage[6] is estimated. Third, the career academy program should enhance lifelong learning by stressing the changing requirements of the labor market and the necessity to maintain and invest in knowledge and skills that are in demand by employers. This path is estimated with Eq. 2.2 in Chapter 2, with the interest in lifelong learning as the dependent variable. Finally, the career academy program should increase academic and workplace knowledge and skills that students take from high school, as measured in our study with GPA, with the rigorous academic standards set by the program, the integrated curriculum, and the work-based learning. This path is estimated with Eq. 2.1 in Chapter 2.

Figure 3.4 also illustrates the indirect influence on postsecondary activities that exists through building knowledge and skills in high school. The increased knowledge and skills that students gain in the career academy should improve their ability to continue education, obtain employment and higher wages, and engage in lifelong learning, as discussed in Chapters 1 and 2. Also, if career academy students pur-

Figure 3.4 The Outcome Goals of the Career Academies


Lifelong Learning: Career Building Human Capital
Direct Effects
Increased Employment and Wages
Indirect Effects (through knowledge and skills gained in high school)
Continuation to Higher Education
High School Career Academy
Increased Knowledge and Skills from High School

NOTE: Heavier arrows indicate a direct effect in the career academy's impact. Lighter arrows indicate an indirect effect.

sue postsecondary education, their employment opportunities and wages should be greater. In the same vein, the continuous improvement in knowledge and skills that accompanies lifelong learning should enhance employment and wages throughout the student's stay in the labor market.

Theoretical Homogeneity in Career Academy Structure

Figure 3.4 shows the general framework that the district adopted to improve educational outcomes of its students. Of course, the challenge in implementing this model lies in structuring the career academies so that they produce the desired results. The model includes both school-based and work-based components. The school-based learning component calls for students to take four academy classes per grade—three academic courses and a laboratory class—to be integrated through interrelated curricula and incorporation of material from and about the industry or profession. Students would take these courses as a group, starting in the 10th grade and staying together for the next three years. Academy students would constitute at least 80 percent of the enrollment in any of the classes that were designed for that academy. A limited number of teachers would design and teach the courses cooperatively and, ideally, stay involved with the same academy for many years.

The work-based learning component includes an internship for many of the academy students after their junior year, and a host of other visits and opportunities to experience the world of work and to learn about the educational pathways to skilled positions. The resources for these work-based learning components come from industry, organized labor, and professional groups. These partners, whose involvement is codified with formal "partnership agreements," work with the academies individually and in advisory committees. Attachment 3.A is a school district planning document that delineates the goals, outcomes, and practices of the work-based learning component of the academies. Explicit attention to these components is expected of the employer, teacher, and student, so that none of the parties treats the experience as simply a "summer job" (for example).

Theoretical Homogeneity between Academy and Nonacademy Students

The district also established policies for the career academies so that they would reflect a heterogeneous group of students from all levels of prior academic achievement. They explicitly wanted to avoid creaming off only high achievers or, conversely, taking only those with academic problems. As a result, the district structured the academies as part of its magnet program so that all academies were formally governed by one set of operating rules.[5] In theory, all academies had the same formal application, entrance requirements, recruiting procedures, and stipulations for students to remain in the program and to be eligible for opportunities such as internships. The director of the Media Academy expressed his program's philosophy in late 1992:

> The Media Academy does not track students by test scores or perceived abilities. We mix our students across a wide spectrum of abilities and talents. Students with higher test scores in reading assist peers with lower scores, bringing them to collectively and individually higher levels over the course of three years of study in the Academy.
>
> We reject the idea that certain students are destined to have difficulty graduating from high school while others are labeled "college material." Our mission is not only to keep our students in high school but to prepare all of them for college or postsecondary vocational education immediately after graduation, if that is what they choose to do.

The district's policies include explicit reference to targeting students who are "at-risk" of school failure. The term "at-risk," which is awkward for some of the teachers who must use it and for the students so labeled, is intended to encompass a number of characteristics of family circumstances or student performance. In writing about the Health Academy, Jobs for the Future—a national organization helping to increase the capacity of school-to-work programs—described the policy for the district as a whole:

> The Academy targets students considered at-risk because of a past record of underachievement and low test scores, poor attendance, low family income, or disinterest in the regular school program... Most students enter the Academy with a history of academic fail-

ure and a lack of employment skills. However, the Academy accepts a full range of students to avoid at-risk labeling, to provide academic role models, and to continue its commitment to a heterogeneous, non-tracked approach. All Academy students are perceived as students with potential.

Differences between Academy and Nonacademy Students in Practice

Despite the district's commitment to inclusiveness and heterogeneity, academy students differed from nonacademy students in their demographics, parental background, and knowledge and skills brought to high school. Academy students were more likely to be female and African American and less likely to be Latino and Asian than were nonacademy students. A smaller percentage of academy students than nonacademy students were from the special education and limited English proficiency populations, perhaps a cause of their higher standardized test scores in 10th grade.

These attributes do not necessarily mean that the career academies selected the district's best students, even if higher standard test scores existed. By admitting a disproportionately low percentage of special education and limited English proficiency students in career academies, test score averages would be increased. In addition, qualitative evidence suggests that Advanced Placement students were less likely to be included in most of the career academies. If both academically challenged and academically gifted students (as determined by 10th grade test scores) were underrepresented in career academies as compared to other programs, then less heterogeneity in scholastic performance at program entrance would exist. Two district practices contributed to the divergences between academy and nonacademy students. Developing more career academies at the schools with the lowest socioeconomic status and relying on word-of-mouth advertising (consistent with district restrictions on recruitment) created differences between academy and nonacademy students.

In the early 1990s, the district focused development of career academies at high schools with service areas containing populations from the lowest socioeconomic status (Table 3.3), a decision that was reinforced by the redevelopment agency's funding priorities. In fact, the

Table 3.3 Which Type of Schools are Academy Students In?[a]

School	Academy students	Nonacademy students
Lowest SES[b] schools		
HS3	18.5**[c]	3.0
HS1	18.5**	13.5
Middle SES schools		
HS2	14.7**	24.2
HS5	29.2**	11.1
Highest SES schools		
HS4	6.9**	24.0
HS6	12.1**	24.2
N	1,397	8,549

SOURCE: Data are from the City Student Database and reflect enrollment patterns of students in our three cohorts (sophomores in 1990–93).

[a] Numbers represent percent distribution of academy or nonacademy students in the district across schools.

[b] SES = socioeconomic status.

[c] The asterisks indicate that significant differences exist between the sample means as determined by a *t*-test. ** = significant at $p \leq 0.05$ level.

proportion of the district's academy students at HS3 (the smallest high school and the one with the lowest socioeconomic status attendance area) was six times that of the district's nonacademy students. This was due, in large part, to the fact that both the city and district viewed the career academy program as a potential reform for a largely dysfunctional school. In contrast, the proportion of the district's academy students at HS6 (the high school with the highest socioeconomic status attendance area) was half that of the district's nonacademy students. The differences in school size and academy development meant that the enrollment of students in career academies varied greatly as a proportion of total enrollment within a school, from 50 percent to under 8 percent (Table 3.2). This alone would suggest that the academies occupy somewhat different niches in the each school's overall environment.

The district, through its magnet program guidelines, stipulated that a career academy admit 25 percent of its students from outside the school boundaries, should such applications exist.[6] In practice, only two of the career academies served as magnets and had enrollment from students living outside their school's designated boundaries. The more typical scenario was one of active recruitment of students into career academies from the 9th and 10th grade classes in the high school or from its feeder junior high schools. Recruitment efforts included academy directors' visits to 9th grade classrooms, recruitment booths at Career Day, and active word-of-mouth advertising by students and teachers.

This energetic recruiting was stimulated by the enrollment benchmarks in the city's contract for academies' funding. The enrollment target was originally set at 150 for each academy—ideally, two class sections of 25 students each for each of three grades—but after several years the limits were set individually by program. Once academies set their own size, their targets and actual enrollments varied widely, in keeping with school size, demand, and the teachers' capacities and preferences. The average enrollments ranged from 85 to 221 in 1994–1995 and averaged 121.

Differences in Model Implementation

Despite the centrality of, commitment to, and relatively long duration of the district-created career academy model, a complete academy program had not yet been achieved across the board by the end of our study period and, indeed, by the completion of this book in 2000. As Table 3.4 shows, the academy's structure was implemented with varying degrees of completeness. At the most basic level, academies generally succeeded at keeping their students together. Nearly 80 percent of students in designated academy courses were, in fact, enrolled in that academy. This may not at first seem like a noteworthy outcome, but getting to this percentage represented a major accomplishment, since "school-within-a-school" strategies present problems in the assignment of teachers and students throughout the institution.

The academy programs were less successfully implemented in other areas (Table 3.4). For example, academy students averaged only about 13 academy semester courses. Only about 23 percent of the academy students took close to a "full academy curriculum" of at least 20 courses.[7] Because the academy program consists of 22 courses, our 20 course definition of "full academic course load" understates the severity of lack of implementation. Incomplete academy course work may stem from students not having been enrolled in the program for the full period of time. Only about 28 percent were enrolled in their sophomore, junior, and senior years, which was the intended duration of the program. Fewer than 60 percent of academy students were enrolled in both their junior and senior years.

The teaching staffs tended to fluctuate from year to year in all academies, with only 23.4 percent of the teachers remaining in an academy for all four years of this study (Table 3.4). With one exception, an academy had a solid core of two or three teachers, some of whom had been with the program for a decade by 1995, who undertook most of the extra work. They were typically complemented by a larger group of teachers rotating in and out for one- or two-year stays. Some, if not most, of these short-term participants were not as engaged in developing or even in teaching the curriculum, or in supporting the work-based learning components, as were the long-term academy teachers. This turnover in staff resulted, in part, because collective bargaining agreements made it impossible for academy directors to recruit teachers to fill openings in academy staffs. Rather, the prerogatives of seniority and the scheduling needs of the principal dominated year-to-year assignments in the academies. The filling of slots with teachers who had little time or interest in taking on the special duties of an academy, in order to make the schoolwide personnel budget and schedule balance, was a continual source of frustration for the program managers and site-level directors.

Relatively few academy students in our study were exposed to key work-based learning components of the program (Table 3.5). Only about 31 percent of students had a mentor and only about 37 percent had internships.[8] However, for interns, the experience was extremely positive. Over 90 percent of these individuals stated that the internship made them realize the importance of doing well in school. Internships also appear to be a source of both academic and work-based training, with over 60 percent of the interns using reading, math, and writing on the job. Interestingly, these strong positive views were attained even

Table 3.4 Program Description of Individual Career Academies

	Total	HS3[a]		HS1		HS2	HS5		HS4	HS6
Program characteristics		Business	Law	Computer	Trans-portation	Media	Engineering	Health	Visual Arts	Performing Arts
Academy										
Year operation began	1985	1986	1991	1987	1992	1986	1989	1985	1992	1989
Age (as of 1995)	—	9	4	8	3	9	6	10	3	6
No. of students (1994–95)	106 (avg.)	85	90	126	101	160	132	221	87	85
Course enrollment[b] (%)										
Nonacademy students in courses	16.3	16.3	16.9	39.4	20.6	10.4	10.8	13.3	13.5	13.2
Academy-appropriate students in courses	79.2	81.4	82.7	55.1	77.2	80.6	81.3	82.2	86.2	79.7
Students' exposure to program										
Average no. of academy courses taken	12.7	13.4	16.5	10.3	15.8	15.8	12.9	15.4	11.5	4.3
% with 0 academy courses	8.8	6.7	4.1	5.9	4.7	4.0	7.5	5.1	7.9	30.8
% with at least 20 academy courses	22.8	21.8	42.3	8.6	28.1	35.7	26.1	37.5	1.1	0.0

(continued)

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Table 3.4 (continued)

Program characteristics	Total	HS3[a]		HS1		HS2	HS5		HS4	HS6
		Business	Law	Computer	Trans-portation	Media	Engineering	Health	Visual Arts	Performing Arts
% enrolled junior and senior years	58.4	64.2	52.6	45.2	50.0	67.3	58.3	65.3	52.8	59.1
% enrolled sophomore, junior, and senior years	27.8	25.7	50.5	12.4	45.3	30.7	25.1	27.3	30.3	27.7
% with internships[c]	36.6	32.9	51.5	33.0	62.5	37.6	45.0	37.5	48.3	4.4
Teachers' experience in academy[d]										
% of teachers in all 4 years	23.4	29.4	11.7	31.2	22.2	26.7	22.7	25.0	66.7	0.0
% of teachers in only 1 of the 4 years	43.6	47.1	52.9	31.2	36.8	46.7	45.4	45.8	16.7	50.0
Curriculum integration										
% of curriculum that is integrated[e]	30.7	12.2	52.1	52.2	24.5	35.9	43.1	42.7	13.9	0.0
Level of advisory committee and community partnership activity[f]	2.1	2.0	2.5	1.5	2.0	2.5	2.0	3.0	2.5	1.0

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[a] High schools are listed in order of the socioeconomic status of its service area, with HS3 drawing from the lowest socioeconomic area and HS6 drawing from the highest. Data were drawn from the transcripts of students in our three cohorts (sophomores in 1990–1993).

[b] Data on course enrollment and number of academy courses are from the City Student Database and reflect enrollment patterns of students in our three cohorts (sophomores in 1990–93). Because academy students from one academy can enroll in another academy's courses, the percentages under "Course enrollment" may not sum to 100.

[c] The percentage of internships was computed using the local evaluation files. Because students in the Performing Arts Academy did not receive city-funded internships, its percentage was computed by dividing the number of intern surveys returned from students in this academy (7) by the total number of students in this academy (159).

[d] The teacher experience variables were computed from the 1991–1992 through 1994–1995 school years for all academies except Visual Arts, Computer, and Trade and Transportation. The four-year period for these academies was the 1992–1993 through 1995–1996 school years.

[e] In the 1993–1994 school year, academies were directed to provide evidence of curriculum integration in all academy courses. "The percent of integrated curriculum" is computed as the sum of the completed course outline and lesson plans divided by the total number of course outlines and lesson plans.

[f] The "level of advisory committee and community partnerships activity" is a categorical variable with 1 = not underway or barely started, 2 = partially developed and somewhat effective, and 3 = fully developed and very effective, as of 1994. The level of activity was determined by averaging the scores assigned by two observers with districtwide perspectives: the independent program evaluator and the school district's School-to-Career program director. Evidence included committee rosters, meeting minutes, written partnership agreements, and inventories of partners' activities.

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Table 3.5 Work-Based Learning in Individual Academies

Characteristic	Total	HS3 Business	HS3 Law	HS1 Computer	HS1 Trans-portation	HS2 Media	HS5 Engi-neering	HS5 Health	HS4 Visual Arts	HS6[a] Performing Arts
Work-based learning[b] (%)										
With mentors	30.6	NA[c]	NA	34.6	NA	27.1	23.1	22.2	41.2	NA
With internships	36.6	32.9	51.5	33.0	62.5	37.6	45.0	37.5	48.3	NA
Evaluation of internship (%)										
With training	82.0	78.0	76.7	82.1	85.7	87.0	83.7	83.7	74.2	NA
Using reading	90.1	91.5	83.3	90.0	92.9	95.6	91.8	88.4	77.4	NA
Using math	64.3	49.2	66.7	68.3	71.4	68.6	77.6	44.2	75.0	NA
Using writing	88.5	81.4	83.3	95.1	92.9	94.3	87.8	86.0	83.9	NA
Say teacher/staff visited site	35.4	58.6	73.3	92.7	67.9	62.7	65.3	37.2	76.7	NA
Say that school helped job	83.5	69.5	93.3	90.3	78.5	91.0	89.8	81.4	71.9	NA
Say school helps realize importance in learning to do well on the job	85.2	79.7	83.4	92.7	82.1	91.2	87.8	93.0	62.5	NA
Say job helps realize importance in learning to do well in school	92.5	93.2	96.7	95.1	89.3	95.6	93.9	93.0	78.1	NA
N	359	59	30	41	28	70	49	43	32	7

[a] Because HS6 was not funded by the CRA during the period of study, data are not available on its work-based learning activities.

[b] Data on work-based learning (other than mentoring) are from the workplace surveys in the local evaluation files. Data on mentoring are from the post–high school survey in the City Student Database.

[c] NA = data not available.

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though a teacher or staff member visited the work site in only about one-third of the cases.

Differences in Academy Development

As both Tables 3.4 and 3.5 show, the components of the career academy model, and the model itself, were implemented with varying degrees of completeness across academies. Many of the differences in implementation can be traced back to one of two sources: 1) diverse levels of CRA funding to each academy and 2) disparate school environments with varying school populations. Both of these factors were critical in determining the speed, completeness, and effectiveness with which the model was implemented in schools across the city.

The CRA funding greatly facilitated the growth of an academy's program by providing critical resources to help it through developmental stages. This can best be illustrated by the exception. The Performing Arts Academy, which went without CRA support for the entire study period, never was fully implemented during that time. This academy was established three years prior to the Transportation Academy (formally known as the International Trade and Transportation Academy), yet by 1994, its students averaged only about four academy courses (Table 3.4) as compared to 16 for Transportation Academy students. Thirty-one percent of Performing Arts students and 5 percent of the Transportation students had no courses within the academy. No Performing Arts students and 28 percent of the Transportation students had the complete academy program of 20 academy courses. Virtually no Performing Arts students had internships, while nearly two-thirds of the Transportation students had them (Table 3.5). The Performing Arts Academy also suffered from staff instability (no teachers were in the program all four years), lack of curriculum integration, and lack of community partners.

While the development of the Performing Arts Academy was not enhanced by CRA support during the years of this study, neither was its development sparked by reform pressures. This was true for both academies—Performing Arts and Visual Arts—at the two schools with the highest socioeconomic status (high schools 6 and 4), in part because these schools were slow to embrace the academy model. They were left out of CRA funding support for several years. They chose arts-focused themes (Performing Arts, Visual Arts) and, until the mid 1990s, resisted implementing the work-based learning components of the model. Neither parental nor political pressures for school reform were present. Because these schools had the highest percentages of students going on to four-year college, many teachers were on guard against perceived "vocationalizing" of their relatively successful academic tracks. This trend was gradually overcome at the Visual Arts Academy, which for its first several years used the name Visual Arts Magnet Program. By 1993, once these teachers developed a variant of the curriculum model that met both their needs and the district's school-to-work requirement, the staff embraced the internships, started a very successful student-run enterprise, and generally moved into the academies' mainstream.

Conversely, academy programs proliferated, in number and in the proportion of students enrolled, at the two schools with the lowest socioeconomic status service areas (high schools 1 and 3). Three academies each were established at high schools 1 and 3 before any other school had three, and high school 1 was the first to announce its plan to convert to a schoolwide career path system. However, those schools faced extreme challenges such that their academies often had uphill battles to maintain a coherent staff, curriculum, schedule, and facilities. Because of these schoolwide limitations, these academies were not as strong or complete as they might have been in more mainstream environments. In cases where important program innovations developed, these tended to be in extracurricular activities and personal support for students rather than in the core courses. A prime example is the Youth Court, a successful outgrowth of the Law and Government Academy at high school 3 that provides real world justice system experience. The Youth Court started in the academy proper but soon became a separate but affiliated nonprofit organization.

It was at the high schools with students from the middle of the socioeconomic strata (high schools 5 and 2) that the strongest career academies emerged. Within this stratum of schools, the right mix existed with respect to pressure for reform and teachers with the creative ideas and leadership needed to start and build academies. Media, Health, and Engineering, the three most comprehensive of the original four CRA academies, were at these schools. While their overall institutional environs were still challenging, they were not as difficult as at the two schools with the lowest socioeconomic status (e.g., dropout rates were not so extreme, absenteeism was not so high, and the facility was more workable).

The heterogeneity in the career academies suggests that a single proxy variable for academy development cannot capture the intricacies of the program offered. Since the academies are basically a voluntary option, the number of students enrolled might indicate program robustness or stability. Enrollment is a useful variable for some purposes but turns out not to be a good proxy for the level of program development. For example, although the Computer and Engineering academies were nearly the same size, the Engineering Academy offered a much more complete program. Its students took, on average, about three more academy courses than did students in the Computer Academy (Table 3.4). Nearly three times as many Engineering as Computer Academy students had the complete academy course load, and the proportion of those having internships was 1.4 times greater. Similarly, the number of years of operation alone does not approximate the strength of a program.

Instead, academies differed in their relative strength because they were in various stages of completeness. The ones that were above average on virtually all components of the model (number of students and course enrollment, students' exposure to the program, teacher experience, Advisory Committee) are the Health, Media, Engineering, and Law academies. Still, all of these academies had greater-than-average teacher turnover, and the Engineering and Health academies had slightly fewer students enrolled in all three years. The remaining academies were less developed than average in five or more of the component categories.[9]

SUMMARY AND CONCLUSIONS

The district in this study faced below-average indicators of academic success, and the business leaders of the city were concerned about the dearth of qualified workers. This led to pressure for exceptional measures. The promising early history and good reputation of the district's first career academies led local governmental leaders to join educators in 1990 in an effort to improve both academic achievements and workplace skills. Over the next seven years, the city and district gradually built a network of academies within a broader system of school-to-work activities. However, the city's career academy model differs from others around the nation because of its strong implicit stress on educational success and its relative lack of emphasis on immediate labor market placement.

Although the school district developed a relatively comprehensive model of its career academies program, important differences exist in its implementation among the sites. Most of these divergences stem from disparate levels of funding and school environments in which the academies developed. As a result, the academies varied in the degree of completeness. Three of the oldest academies, Health, Media, and Engineering, embody the most nearly complete program model.

Despite these differences, we deliberately refer to "the academy model," knowing that it is in many respects an ideal, rather than a total experience for all students. Indeed, this divergence of actual circumstances from the ideal is central to our analysis. If variations in the way the model has been implemented underlie the program's impact, they become central to understanding program outcomes. In fact, in the "real life" of central city school systems, many programs must operate for a long time in a partially developed state, which often leads to a wide gap between pilot program and systemwide reform. Our analysis has been designed in a variety of ways to accommodate this important institutional diversity.

Notes

1. The level of yearly funding obtained by the school district was somewhat less than the maximum possible amount (and averaged 85 percent of the maximum over the first three years) because certain sites achieved at levels significantly below the performance standards. The CRA contract was renewed with modifications through the 1997–1998 school year, with the maximum set at $800,000 in each of the final three years.
2. A study in 1990 done by redevelopment agency staff, based on secondary sources and interviews with employers, generally supported the contention that these four academies addressed the increased demand for technically skilled new workers in the city. Selecting these four was also based on the school district and city staffs'

assessment that they were the most prepared to meet the demands of a performance-based contract.

3. This one-time source was a local (but not redevelopment agency) capital improvement grant for two academy facilities: an aviation mechanics shop and a school-based health clinic.
4. The Center for Law and Education, Jobs for the Future, and the National Center for Research in Vocational Education were three of the most prominent providers of technical assistance. Their activities were supported by private foundations and by the U.S. Department of Education.
5. Career academies were the only magnet programs in the high schools at the time of this study.
6. Students applied by completing a form (with parental signature) for the district office. Some academies conducted interviews as well.
7. Twenty-two courses would constitute a full, three-year academy load.
8. The small number of internships is attributable, in part, to the restrictions that only students with a GPA of 2.0 or higher could qualify for an internship.
9. Some heterogeneity can be found among the academies with respect to the curriculum offered, with most of this variation reflecting logical differences in the relationship of course work to the areas of career development. For example, students in the Visual Arts Academy average five academy courses in art, Media Academy students average nearly nine academy courses in English, and Health Academy students average over six courses in science.

Attachment 3.A: Work-Based Learning Planning Document of the Case Study School District

Work-Based Learning

The Goals

Engage students in work-based learnings that is integrated into a career path curriculum and supervised by school and work-site personnel. Work-based learning opportunities include: study tours, job/career shadowing, school-based enterprise, cooperative education, internships, and youth and pre-apprenticeships.

The Outcomes

1.0 Students will demonstrate mastery of general employability skills in a related work environment, including:

–Appropriate work behavior
–Working with others
–Basic skills
–Thinking and problem solving skills

2.0 Students will demonstrate mastery of career cluster skills and selected occupational skills in a related workplace environment, including:
–Ability to transfer skills and knowledge learned in school to the workplace;
–Basic academic and occupational skills; and
–Use appropriate language in the workplace.

3.0 Students will demonstrate mastery of "all aspects of the industry," including:
–Understand the interrelationship between the department or work unit in which they work to the overall organization;
–Understand systems of management, finance, and accounting used in their place of employment;

–Understand the role of organized labor in the success of American enterprises;
–Understand the health, safety, and environmental issues relevant to their place of employment; and
–Understand the technologies of production important in their place of employment.

The Practices

1.0 Students engage in work-based learning that is integrated into a career path curriculum and supervised by school and work-site personnel.

2.0 Students work from a training plan that includes "all aspects of the industry."

3.0 Students are assigned a mentor in the workplace.

4.0 Employers/Mentors oriented in their role in teaching "all aspects of the industry," communicating effectively, and tolerance and empathy toward young people.

5.0 Employers/Mentors included in staff development in school site planning, visit schools or work with mentors.

6.0 Teachers gain experience in related careers/occupations through business and industry internships and a performance project.

7.0 Two contact persons are designated. One to coordinate all opportunities between the district and individual schools, and a second to coordinate all opportunities within individual schools.

8.0 District guidelines are developed for consistency across schools. Each school will operate within the same set of standard operations and procedures.

9.0 Occupational advisory committee membership includes professionals with in-field experience as well as educators. (Recommended: committee members conduct periodic equipment assessments to determine whether instructional materials matched industry needs, and survey employers to understand their needs.)

10.0 Teachers organize school assignments that include activities required to start and maintain a business or organization such as management, marketing, finance, and accounting, and instill workplace skills such as interpersonal communication, discipline, and problem solving.

11.0 At least one school-based enterprise operates in every elementary, middle, and high school.

12.0 School-based enterprises are integrated into the schools' academic and vocational curriculum.

[Note: Official school district document.]

4

Understanding the Impact of the Career Academy

The academies in our case study community were supported in order to improve students' success in higher education and in the labor market. These outcomes could be achieved through any of several means. Individuals could be motivated to study by forging a strong relationship between an academy and its industry or profession; by increasing students' understanding of jobs, career paths, and workplaces; or by building their self-esteem and networks for achievement. The academy program would thus directly enhance the desired postsecondary outcomes because it was designed to present students with a cohesive picture of the attributes necessary for success. Alternatively, the career academy could increase the knowledge and skills that students take from high school. In this case, it is the skills that facilitate postsecondary success, and the academy is merely the mechanism that builds these skills. This distinction is captured in the conceptual model of the district's approach that was outlined in Figure 3.4.

In this chapter, we follow the paths from inputs to outcomes in Figure 3.4 by estimating the models outlined in Chapter 2 for students who were in the academies as compared with those who were not. The distinction between direct and indirect effects is critical to this analysis because it gives us insights into the mechanisms by which the reforms have an impact. While the career academy is intended to increase the student's knowledge and skills, its ultimate goal is to facilitate postsecondary success. Since this can be done through skills or through other independent effects, we separate the degree and impact of a student's scholastic achievement in its own right from the additional effects of participating in an academy.

THE MECHANISM OF CAREER ACADEMY SUCCESS: HUMAN CAPITAL

School-to-work programs are grounded in a fundamental premise of human capital theory—the idea that education increases an individual's productivity in the labor market and that this higher productivity raises the individual's earnings.[1] The notion that high school graduates need more productive skills, and that those skills will be rewarded in the marketplace, is widely accepted as a rationale for school-to-work programs, both in the case study city and nationally.

While the general relationship between education, productivity, and earnings is well established, the link between a student's specific high school program and subsequent productivity and earnings is somewhat ambiguous, perhaps because defining a high school program is often difficult. Inconsistencies in research examining the relationship between high school programs and outcomes may result from the problem of distinguishing the capacity and cohesion of any particular program from its individual courses or components. For example, completing high school (e.g., Altonji 1995) and work internships that are linked to the schooling (e.g., Stone 1990; Stern, Raby, and Dayton 1992; Barton 1989) show a positive effect on postsecondary outcomes. Both of these factors, program completion and program linkages, may reflect program cohesion. In contrast, the individual courses taken in school (e.g., Altonji 1995) and general work during high school (e.g., Greenberger and Steinberg 1986), especially work with longer hours (e.g., Stasz and Brewer 1998), have been shown to have an insignificant or negative impact on postsecondary outcomes. These individual program components do not necessarily include program cohesion.

Proponents of school-to-work programs in general, and of career academies in particular, have made the case that these increase productivity and wages in the labor market by providing a cohesive curriculum. The academy model is more than simply collections of classes. Academies are organized to keep their teachers in small, focused, and integrated teams, and their students in groups that stay together for three years, for the purpose of attaining program cohesiveness. When academies provide instruction, guidance, and experiences that encourage good work habits such as punctuality and reliability, they are seeking to directly increase their students' general human capital and production in the labor market (e.g., Weiss 1988).

The importance of this "direct" impact on productivity and earnings is matched by the related expectation that earnings will grow with the greater cognitive skills gained from the program. Career academies, through more rigorous academic standards, provide students with the cognitive skills that are increasingly rewarded in the labor market.[2] By enhancing the knowledge and skills taken from high school, the career academy would facilitate postsecondary success.

The career academy model is structured to provide several different types of knowledge and skills. Raising general standards for academic achievement can increase overall human capital. This school-based learning benefits future employers and individual students initially through increased productivity and earnings and then later as workers acquire knowledge and skills throughout their work life. The capacity for lifelong learning is created because students who acquire knowledge and skills in high school have a greater ability to undertake and succeed in postsecondary education (e.g., Hause 1972) and to acquire more human capital while on the job (e.g., Altonji and Spletzer 1991; Veum 1993).

Career academies can also enhance specific human capital with work-based learning and with other experience linked to a particular career theme. These characteristics of career academies can impart occupation- or industry-specific human capital, much as traditional vocational education has done. This effect would decrease training costs for employers in a given field and increase earnings for individuals, but only if they were employed in the specific industry or occupation around which the academy was built.

A strong implicit belief in these aspects of human capital theory, or at least in the potential for building human capital in the city's workers, was shared by the educators and policymakers who directed the city's redevelopment funds into the career academies. By investing in this program for public school students, and thus increasing the human capital of future workers, the city hoped to reduce unemployment, keep successful workers in the community, and attract employers.

This conceptual grounding of the career academies as human capital investments adds temporal dimensions to the representation of program outcomes in Figure 3.4. Like any model of investments, the initial period is followed by one during which investments earn a return.[3] The city's career academies, and other school-to-work programs, deviate slightly from this model because investments are assumed to be continuous throughout one's life. Nonetheless, we distinguish here between a short-term time horizon, in which investments are made and returns are not yet realized, and a long-term time horizon, at which point returns are realized, as a way of discussing expected program results.

Expected Outcomes in the Short Term

Young people choose among a number of pathways in moving toward stable employment during their first few years after high school (e.g., Klerman and Karoly 1994). For many youth, the pathway may be from (high) school to (postsecondary) education to work. For others, it may be from school to work and then back to school, along with various combinations of education and simultaneous employment. Once in the labor market, youth often "churn" as they move frequently between work opportunities (e.g., Osterman 1980) and between jobs and school. As a result, unemployment during this period is sometimes beneficial,[4] and faster transitions to stable employment for youth do not always improve labor market outcomes for them as adults (e.g., Gordecki and Neumark 1998).

During the churning that occurs in the early forays into the labor market, young people build skills that underlie their future employment and wages (e.g, D'Amico and Maxwell 1994). Individuals who devote most of their effort to employment can develop both general and specific human capital on the job that will increase earnings. Alternatively, individuals who give their primary effort to postsecondary schooling will not accrue as much, or any, on-the-job training, but they will build general human capital that increases their future earnings. Even if an individual works while in school, a very common occurrence, the on-the-job skill building will usually be less than if the work were full-time, because the jobs that students hold are frequently not laden with training opportunities.[5]

Since both employment and education build human capital in the period immediately following high school, a negative or insignificant relationship between earnings and investment exists in early years in the labor market (Neumark and Taubman 1995), as Figure 4.1 shows. Because people who acquire full-time jobs receive more immediate returns on their investment, their earnings initially rise more steeply than those of individuals who delay permanent attachments to the labor market and pursue postsecondary education. However, individuals who invest in postsecondary education realize increasing earnings over their working life.

By combining the program's goals for outcomes (Figure 3.4) with the temporal dimensions to investment returns outlined in Figure 4.1, we developed five hypothesized relationships about the short term that are tested in the analysis described in Chapter 2.

1) The career academy will increase the human capital that students accumulate in high school. This is a program goal, and the relationship should be established by the time that the student leaves high school.

2) The career academy will directly raise postsecondary educational attainment.

As we have seen, the career academy is designed to motivate students to attend community colleges and four-year universities and colleges. This gain in attendance should be manifested in the years immediately following high school.

3) The career academy will improve postsecondary educational attainment indirectly, through increased knowledge and skills accumulated in high school.

The career academy should enable students to attend postsecondary education by enhancing academic preparation, which will mostly occur in the years immediately after high school.

The remaining two hypotheses are concerned with wages and earnings.

4) The career academy may not have a direct impact on employment and wages in the first few years out of high school.

The direct impact of the career academy on employment and wages would occur if these outcomes were increased in ways that did not result from knowledge and skills acquired in high school. For example, students would obtain better jobs if the career academy imparted better networking or employment search skills. Different types of school-to-work programs may emphasize the transition from "school-to-well-paying jobs," and in those cases we would assume a different hypothesis. However, the city and the district in our study stressed academic preparation over job readiness. This, in combination with the churning of youth in the early years after high school, suggests that stable employment and increased wages may not occur in the years immediately following high school.

5) The career academy will have an indirect impact on employment and wages in the short term through increased skills gained in high school.

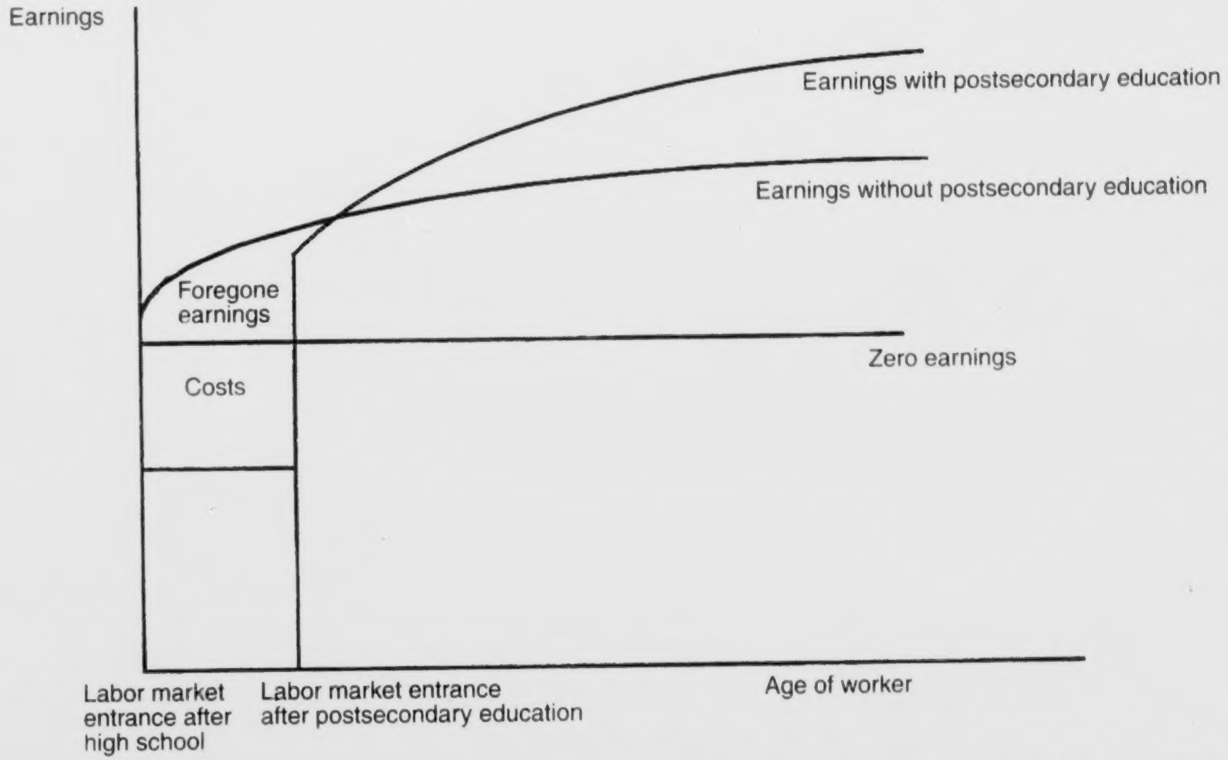
Because the career academy builds skills that are tied to labor productivity, individuals who accumulate these skills will be more productive and earn higher wages than those who do not, *ceteris paribus*. This would be seen in Figure 4.1 as an intercept increase at the time of labor market entrance for career academy students.

Expected Outcomes in the Long Term

Figures 3.4 and 4.1 are also used to develop two additional hypotheses about expected outcomes from the career academy in the long term. These anticipated relationships necessarily differ from those in the short run. For example, over the long term, if the career academy increases postsecondary education, earnings will rise, as Figure 4.1 shows. In addition, the career academy is expected to directly and indirectly better its students' capacity to engage in lifelong learning, which in turn, will improve their labor market outcomes.

Unfortunately, the newness of school-to-work and career academy programs precludes explicitly examining these long-term linkages at this time. To "test" the long-term labor market changes associated with the career academy program, we must rely on the strong empirical and theoretical relationships that exist between education and increased earnings. Certainly nothing in the local labor market during the years of our study or in the voluminous research on the topic contradicts those general connections. Locally, the city's transition to a more knowledge-based economy has fueled a greater public recogni-

Figure 4.1 Earning Streams, with and without Investments in Postsecondary Education


Earnings
Earnings with postsecondary education
Earnings without postsecondary education
Foregone earnings
Zero earnings
Costs
Labor market entrance after high school
Labor market entrance after postsecondary education
Age of worker

NOTE: Investments in human capital are undertaken in two ways. First, direct out-of-pocket "costs" are borne by the individual in the form of tuition, books, etc. Second, earnings are less (or zero as in the case illustrated above) than they might be with full-time employment that is not accompanied by schooling. Returns on the investment come in the form of higher earnings, which includes both increased wages and increased employment.

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tion of the tighter link between increased education and training and higher pay. Since much of the impact of high school programs in this community has traditionally been through improved access to continued education, our empirical focus on the short term, although dictated by limitations of time and data, may nonetheless be fitting.

As a crude approximation for long-term program outcomes, we have self-assessments of respondents' perceived ability and interest to engage in lifelong learning. These measures were described in detail in Chapter 2. We use these items to assess the career academy's ability to increase human capital over the course of one's life. For this analysis, we develop the two additional hypothesized relationships that are tested in this study.

6) The career academy will directly increase the interest in lifelong learning.

It is an explicit goal of the career academy program that contextual learning convey to students the necessity of constantly upgrading and changing skills throughout their working life. This should provide individuals with the motivation to engage in continued learning.

7) The career academy will indirectly increase the perceived ability to engage in lifelong learning by building knowledge and skills during high school.

The career academy should enable students to be involved more thoroughly in continuous learning as a result of their increased academic preparation, which makes subsequent studying easier.

DO CAREER ACADEMIES INCREASE HUMAN CAPITAL IN HIGH SCHOOL?

Three important indicators suggest that students from career academies take higher levels of human capital from high school: grade point average (GPA), 12th grade test scores,[6] and rates of dropping out of high school (Table 4.1). The GPA of academy students is nearly half a grade higher than that of nonacademy students, and test scores of academy students are about 30–40 percent higher. This increase in the

Table 4.1 School and Work Activities after High School[a]

	Academy	Nonacademy
High school		
GPA	2.30**[a]	1.86
Reading percentile (12th grade)[b]	37.4**	25.5
Language percentile (12th grade)	42.2**	32.4
Educational achievement		
% high school dropout	7.8**	18.0
% high school graduate	92.2**	82.0
% attend 2- or 4-year college	80.7**	72.5
% attend 4-year college	51.7**	35.8
Labor market outcomes[c]		
Average hourly rate of pay	6.93	7.42
Average weekly hours worked	28.4	27.5
N	270	918

SOURCE: Data are from the City Student Database. High school data are drawn from the transcripts and records of students in our three cohorts (1990–1997). Educational achievement and labor market outcomes are drawn from survey data collected in 1996.

[a] The asterisks indicate that significant differences exist between the sample means using a *t*-test; ** = significant at the $p \leq 0.05$ level.

[b] The percentage of students for whom test scores are reported varies dramatically across schools and academies because the test-taking percentage varies. On average, only about 40 percent of the students have a 12th grade test score reported, in part because HS6 is not a Title I designated school and therefore is not required to report test results to the state.

[c] Work outcomes are reported only for individuals with a job (defined as working at least one hour during the week).

GPA of academy students may cross a critical threshold because the difference is between a D/D+ average for nonacademy students and a C average for academy students. Since admission to postsecondary education is often more difficult for students with a high school GPA below a C, raising the GPA into the C range could open college doors. Of course, the most basic precondition to learning in school is staying in school. Consistent with other studies, the dropout rate for academy students was less than half that for nonacademy students.

Simple descriptive statistics cannot test hypothesized relationships, however. Students do not enter high school as empty vessels for teachers to fill. Instead, they have 9 or 10 years of formal education and about 14 years of out-of-school experiences, some of which undoubtedly affect their subsequent academic performance. Because these prior experiences in and out of school differ, students begin high school with various levels of preparation and readiness to learn. If students who enter career academies start high school with above-average readiness, we would expect them to exit from high school with above-average skills, even if the career academy program is no more effective than alternative courses of study.

Our multivariate estimations control for differences in preparation and some experiences by using academic test scores in the sophomore year to measure the cumulative effect of inputs to the education process, as discussed in Chapter 2. In the next chapter, we introduce the possibility that school-specific influences also impact the career academies' potential for improving knowledge and skills taken from high school.

Table 4.2 presents results of the multivariate analysis and confirms the academy's ability to increase knowledge and skills taken from high school, as was suggested in the descriptive analysis. The career academy has a positive and significant impact on the student's GPA, *ceteris paribus*. Table 4.2 also shows that each career academy, with the notable exception of two—Visual Arts and Performing Arts—raises high school GPA (see "Academy sites"). The insignificant impact of these examples brings into question the universality of the career academy's ability to enhance students' knowledge and skills. This discussion will be pursued in the following chapter. Nonetheless, it does appear that career academies generally improve the knowledge and skills that students take from high school.

However, the multivariate analysis suggests that the career academies do not directly increase the probability of high school graduation (Table 4.2). Neither being in a career academy in general ("Academy") nor being in any specific career academy ("Academy sites") is significantly related to high school graduation. This is not to say that the career academy does not help reduce high school dropout rates. Other results reported in Table 4.2 suggest that the career academy increases the probability of high school graduation indirectly by building knowl-

Table 4.2 The Impact of Each Career Academy on Work and School Outcomes[a]

	High school							
			Human capital built (by high school program)		Postsecondary education		Labor market outcomes	
Variable	GPA (dev.)	High school graduate	Related to education or current/ last job	Prepared you for current/ last job	2-year college	4-year college	Hours worked	Hourly wage (log)
Academy	0.213**	0.436	0.768**	0.227**	0.098	0.305**	1.806	–0.006
Academy sites								
Business (and Law)[b]	0.250**	–0.305	0.866**	0.662**	–0.668**	0.066	3.163	–0.061
Computer (and Transportation)[c]	0.428**	0.264	0.266	0.165	–0.338	–0.186	1.192	–0.083
Engineering	0.219**	6.664[d]	0.972**	0.128	1.105*	0.781**	0.906	–0.040
Health	0.180**	0.387	1.160**	0.235	0.436	0.677**	4.214**	0.024
Law	0.276**	—	—	—	—	—	—	—
Media	0.159**	0.940	1.018**	0.488**	0.073	0.373	1.626	0.051
Transportation	0.375**	—	—	—	—	—	—	—
Visual Arts	-0.035	0.527	0.804**	0.143	0.091	0.122	4.900	–0.202**
Performing Arts	–0.004	0.681	–0.360	–0.248	1.047	–0.122	–1.100	0.015
Knowledge and skills								
GPA	—	1.620**	0.108*	0.053	0.958**	1.286**	–2.069**	0.041**
Graduate	—	—	—	—	—	—	0.069	0.041

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Table 4.2 (continued)

	High school							
			Human capital built (by high school program)					
					Postsecondary education		Labor market outcomes	
Variable	GPA (dev.)	High school graduate	Related to education or current/ last job	Prepared you for current/ last job	2-year college	4-year college	Hours worked	Hourly wage (ln)
Enrollment	—	—	—	—	—	—	–5.580**	–0.030
Hours worked	—	—	—	—	—	—	—	0.003**
N	4,218	1,142	1,142	1,142	1,142	1,142	736	736

SOURCE: Data are from the City Student Database.

[a] Relationships are based on coefficients estimated from text Eq. 2.1 (GPA) and human-capital built, Eq. 2.2 (education), Eq. 2.3 (hours worked), and Eq. 2.4 (wage). The full results of the estimations are available upon request from the authors. The first row that presents results (Academy) reflects the estimation in which all academies are combined. High school GPA (dev.) and labor market outcome equations were estimated with OLS and postsecondary education and human-capital-built equations were estimated with probit analysis. A dash means that the variable was not entered into the estimation. The dependent variable for GPA is the deviation from the school's average. This essentially "controls for" any differences in grading across the schools. GPA as an independent variable is the individual's GPA. The high school GPA (dev.) estimation includes all individuals, while the remaining estimations include only those who responded to the post–high school survey.

[b] ** = significant at $p \leq 0.05$ level.

* = Significant at $p \leq 0.10$ level.

[c] Academies at HS3 (Business and Law) and HS1 (Computer and Transportation) were combined in equations using post–high school survey data because of sample size limitations.

[d] The impact of this academy could not be estimated because of a lack of variance in the dependent variable. All individuals from the Engineering Academy graduated from high school.

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edge and skills ("GPA" row). Even though the analysis does not show that academy enrollment independently increases the probability of graduating, it shows that career academy enrollment ("Academy') increases high school (GPA[dev]), which in turn raises the probability of graduating ("GPA" row, 1.620**).

The career academy's indirect impact of enhancing knowledge and skills taken from high school is confirmed by further multivariate analysis in which equations were estimated without the inclusion of GPA. In all cases without the GPA control, a significant relationship ($p \leq 0.05$) existed between high school graduation and enrollment in a career academy. Because the coefficients are insignificant with its inclusion, this additional analysis supports the contention that the career academy's influence on postsecondary education is indirect, operating through knowledge and skills.

DO ACADEMIES INCREASE THE PROBABILITY OF POSTSECONDARY EDUCATION?

We next address the question of whether the career academy increases the probability of postsecondary education in the early years after leaving high school. The descriptive data showed that a greater percentage of students who attended career academies moved on to the next level of education, be it a two- or four-year institution, than did nonacademy students (Table 4.1). The results varied with the type of college. When attendance rates at two- and four-year institutions are combined, only about an 8.2 percentage-point difference exists between academy and nonacademy students. However, when only four-year schools are considered, about a 15.9 percentage-point difference exists in favor of the academy students. If career academies created these results, this would be an impressive feat, especially in light of the growing demand for educated individuals in the labor market. Also, since the community colleges' entrance requirements are much lower than those of four-year institutions, the difference suggests that the improvement in knowledge and skills of academy students that was discussed earlier plays a role in increasing their postsecondary attendance.

We are interested in whether the rise in articulation to higher education results from academy enrollment, per se, or whether it stems from the students' scholastic achievement. Once again, the multivariate analysis helps sort out this distinction. Our work suggests that the increase in attending postsecondary educational institutions that is associated with career academy enrollment probably results from the greater knowledge and skills students take from high school (Table 4.2). The results for the individual academy sites in general do not show an increased probability of attending a postsecondary educational institution ("Postsecondary education" columns); that is, few sites have a direct influence on attending college. Instead, the knowledge and skills that career academies help students build while in high school (see GPA) improve their probability of attending a two-year or four-year college. Once again, reestimating equations without GPA controls supports this conclusion. In all cases, the career academy coefficient was positive and significant without this control. Its insignificance with the inclusion of GPA supports its indirect rather than direct role in increasing postsecondary education through raising the level of knowledge and skills taken from high school.

In general, the career academy's ability to build knowledge and skills taken from high school increased the probability of attending postsecondary education—the indirect effect. However, a few academy-specific exceptions exist. The Engineering and Health academies raised attendance at a four-year college, while the academies at high school 3 (Business and Law) increased attendance at a two-year college. The impact on four-year college attendance by the Engineering and Health academies is so strong that the overall measure (covering all nine sites) was significant.

DO CAREER ACADEMIES INCREASE POSTSECONDARY LABOR MARKET OUTCOMES?

We next examine the career academy's potential to increase positive labor market outcomes during the years immediately following high school. All results suggest that, as we hypothesized, the academies have little ability to change labor market outcomes during this period. The descriptive analysis suggests that no significant differences exist in wages or hours worked between academy and nonacademy students (Table 4.1), a result merely confirmed in the multivariate analysis (Table 4.2).

These findings do not negate the possibility that career academies could exert positive impacts in the longer term, or indirect impacts. After all, our estimates are for youth during what is typically a "churning" period. Until young people actually settle into a stable path of earnings and employment, it is difficult to determine the relationship between their investments in human capital and labor market outcomes. In fact, the career academy builds human capital in high school (GPA), and students in the academies are more likely than others to report that their high school program was related to, and prepared them for, their current education or job ("Human capital built," Table 4.2). Assuming that the increased (perceived) linkage and preparation actually contribute to employment-related human capital, wages and employment opportunities will ultimately increase.

Finally, the career academy's indirect impact on improving the probability of attendance at a postsecondary institution may, ultimately, increase wages and employment opportunities. By providing students with the knowledge and skills in high school that result in further education being pursued, the career academy will ultimately lift wages and employment by building postsecondary human capital.[7] Of course, until enough time elapses to test these assertions, they remain mere speculations.

DO CAREER ACADEMIES INCREASE POTENTIAL FOR LIFELONG LEARNING?

Finally, we examine the career academy's capability to increase the student's interest in and perceived ability to engage in lifelong learning. Some of the qualities that we asked about in our survey concerned respondents' beliefs about their capacity to learn (e.g., whether their specific high school program helped them to acquire good study habits and the ability to meet deadlines). Some items concerned their views about whether they had developed a good understanding of the connection between learning and earning (e.g., a positive attitude toward education and training and self-motivation). We use these items to capture the student's perceived ability to engage in lifelong learning.

Table 4.3 shows that students who were enrolled in a career academy were much more likely than other students to report that their high school program provided them with a set of skills that might facilitate lifelong learning. While these differences remain in the multivariate analysis (Table 4.4, "Academy"), interesting distinctions emerge when analyzing outcomes for individual academies. The increase in perceived capacity for lifelong learning is centered in a few places: those

Table 4.3 Preparation for Lifelong Learning: in School and on the Job

	Academy	Nonacademy
Educational learning (% saying that their high school program helped them "a great deal" to):		
Obtain good study habits	25.2**[a]	19.1
Maintain a positive attitude toward education/training	44.9**	31.6
Prepare for current education/training	38.7**	23.7
Be self motivated	45.9**	34.5
Career-building human capital (% saying that their high school program):		
Was related to current/last job or education	48.9**	22.3
Prepared them for their current/last job	55.1**	44.8
Helped them to meet work deadlines	40.2**	26.1
Helped them to see the relationship between school and work	35.2**	26.5
N	270	918

SOURCE: Data are from the City Student Database and from survey data collected in 1996.

[a] The asterisks indicate that significant differences exist between the sample means using a *t*-test; ** = significant at $p \leq 0.05$ level.

Table 4.4 The Impact of the Career Academy on Lifelong Learning[a]

	How much did your high school program help you to:[b]					
	Obtain good study habits	Maintain a positive attitude toward education/ training	Prepare you for your current education/training	Be self-motivated	Meet work deadlines	See relationship between school and work
Academy	0.227**[c]	0.297**	0.342**	0.281**	0.264**	0.296**
Academy sites						
Business (and Law)[d]	0.057**	0.447*	0.519**	0.495**	0.331	0.512**
Computer (Transportation)[d]	0.202	0.062**	0.067*	0.101*	–0.062	0.144
Engineering	0.539**	0.501**	0.620**	0.213*	0.461*	0.352**
Health	0.095	0.284	0.363**	0.259	0.309**	0.439**
Media	0.115	0.501**	0.462**	0.496**	0.588**	0.618**
Performing arts	–0.203	–0.245	0.279	0.204	–0.239	–0.186
Visual arts	0.060	0.192	0.298	0.052	–0.030	0.080
Knowledge and skills						
GPA	0.045	0.132**	0.104**	0.072	0.170**	–0.074
N	1,099	1,099	1,099	1,099	1,099	1,099

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SOURCE: Data are from students in the City Student Database who responded to the post-high school survey in 1996.

[a] Relationships are based on coefficients estimated from test Eq. 2.2. The full results of the estimations are available from the authors. The first row that presents results "Academy" reflects the estimation in which all academies are combined. Equations were estimated with OLS.

[b] The dependent variables are constructed from a 1–4 scale (1 = a great deal; 2 = somewhat; 3 = a little; 4 = not at all). Signs were reversed for ease in interpretation. Positive signs thus indicate that the academy built the skill.

[c] ** = significant at $p \le 0.05$ level.
 * = significant at $p \le 0.10$ level.

[d] Academies at HS3 (Business and Law) and HS1 (Computer and Transportation) were combined in estimating equations using post-high school survey data because of sample size limitations.

academies (Business and Law) at HS3 (a low socioeconomic status school), and at the Engineering, Health, and Media academies. Students in the other academies assessed the potential of their high school program to build the skills necessary to engage in lifelong learning at the same level as nonacademy students, once background characteristics were held constant. As in the previous section, the different effects by site and program call for an analysis of whether systematic differences exist among those programs.

SUMMARY AND CONCLUSIONS

Our analysis of program outcomes suggests that the career academy increases knowledge and skills taken from high school. Even though the academy program is not fully implemented, as we saw in Chapter 3, our results imply that it has a number of measurable effects. Our findings also suggest that academically based skills underlie the career academy's success at increasing the student's probability of attending college. Although we show that the career academy did not influence labor market outcomes during the school-to-work transition period, we speculate that it will increase labor market success in subsequent years by developing human capital at both secondary and postsecondary levels. The career academy's ability to facilitate lifelong learning is somewhat ambiguous. Academy students at one school and in three other academies are much more likely to believe that their high school program helped them build the skills that facilitate learning throughout one's working life, *ceteris paribus*.

Different academies generated distinctive types of benefits and achieved positive outcomes to varying degrees. Two of the least-developed academies (Visual Arts and Performing Arts) showed no evidence of building knowledge and skills in high school, of stimulating postsecondary educational attendance, or of increasing the potential for lifelong learning. In contrast, two of the most-developed academies (Engineering and Health) improved students' skills in high schools, raised the probability of postsecondary educational attendance directly, and indirectly through skill building, and also increased the potential for lifelong learning. The differences in the various career academies' capacity to meet the program's objectives for students suggest that success may depend on ensuring that the new programs are not only well conceived but fully implemented. In our next chapter, we examine the factors that may account for the variation in performance of academies in different contexts and with different groups of students.

Notes

1. Of course, education can merely serve as a signal to employers about the prospective employee's cognitive abilities (e.g., Weiss 1995; Spence 1973). This signaling hypothesis is clearly not the impetus for designing career academy programs, however. If the program's goal were simply to send a signal to an employer via a high school degree, there would be many less complex, less expensive dropout prevention strategies available. We note that we reference both components of earnings—wages and employment—throughout our discussion of returns to the career academy program.
2. The technological upgrading of occupational skill requirements (e.g., Krueger 1993) created sharp increases in the premium for increased schooling (e.g., Katz and Murphy 1992; Blackburn, Bloom, and Freeman 1990) and cognitive skills (e.g., Murnane, Willett, and Levy 1995) and the employment probability associated with quantitative literacy (Rivera-Batiz 1992).
3. Of course, the basic two-period model presented here becomes much more complex when analyzing investments and earnings throughout one's working life (e.g., Heckman 1976). However, the simple two-period model fits nicely as a descriptor of the expected program outcomes of the career academies.
4. Youth unemployment is desirable if it represents job-shopping behavior by individuals who are seeking to find a position that matches their ability and interests, and results in long-term opportunities for advancement and subsequent wage increases (e.g., Becker and Hills 1980, 1983). Conversely, it is undesirable if prolonged unemployment reduces the opportunity for investment in job skills, or causes youth to develop weak labor force attachments, lose out in competition for the limited number of choice entry-level jobs, or forever be labeled by employers as unsteady or unreliable. This "scarring" from initial joblessness may decrease subsequent employment and wages (e.g., Lynch 1989; Elwood 1982).
5. Students in our study are typical in their pattern of intermixing education and work in the first few years out of school. About two years out of high school, less than one-quarter of the former students in our sample were working and not attending school. About two-thirds pursued some form of postsecondary education, with half combining education with employment and half pursuing education only. Distributions differed little by academy status.
6. Recall that tests were not given in 12th grade in one high school.
7. We are not arguing that all students from career academies will complete their postsecondary degree, which is arguably the strongest determinant of increased

earnings associated with postsecondary education. Students from inner-city public schools often have low retention rates in postsecondary institutions. We do, however, believe that some college will increase earnings, *ceteris paribus*.

5

The Origins and Impacts of Differences among the Career Academies

Results that were presented in the previous chapter suggest that the capacity of the career academy to increase the knowledge and skills taken from high school is not uniform across environments. Because improved skills is the key to better high school graduation rates and greater articulation to postsecondary education, the situations under which career academies build knowledge and skills must be examined. It is only with this information that successful programs can be designed and implemented. We must also identify the situations in which career academies are not successful so that impediments to effective implementation can be determined.

In this chapter, we explore three potential factors that could underlie the different impacts that career academies have on building knowledge and skills: initial academic achievement, school environment, and amount of academy course work. Both findings in Chapter 4 and the evolution of the program, as described in Chapter 3, suggest that these three explanations of inter-academy differences may underlie their capacity to build students' knowledge and skills in high school.

As we saw in earlier chapters, students vary in the level of academic knowledge and skills that they bring to each academy. Clearly, these differences are important determinants of the learning students hold when they leave high school. To determine if they also affect the career academy's ability to build knowledge and skills, we trichotomize the students' entry level of achievement in mathematics and English, both reading and language.[1] Because student achievement falls well below state averages, "high" and "low" levels of achievement are relative terms that reference only the population of public school students in this city. Using these triads, we examine if the academies are more effective for students with certain levels of academic preparation than for students with other levels. If this is the case, academies should be limited to those for whom they have been shown to work well, or should be modified to address the differences in students' knowledge and skills. Since many advocates of school-to-work programs recommend universal adoption of the same model, this is a particularly timely issue.

School environments in which the career academies operate vary substantially, and these differences may affect the ability to build knowledge and skills. Although career academies are, by design and necessity, schools within a school, they still depend upon the larger institution for setting policies and establishing program guidelines and are linked to its culture and environment. Furthermore, the city's high schools vary considerably in their resources, social and physical environment, and student body characteristics. Each school in our district houses at least one academy, and each school has a distinct environment, which produce distinct qualities in its academies. Therefore, identifying the structural similarities and differences in the schools that house successful academies might help identify successful contextual elements. Also, since academic achievements vary substantially among schools, the practical definition of a significant, positive program impact might vary. An academy in a scholastically weak school might raise its participants' achievement substantially, even if those students remain well below the citywide or statewide average.

The career academy experience reflects the intensity of the program. As we have seen, academies offer programs with varying degrees of completeness. Even though an overall districtwide model guides the academy's program, the resources and operation of the nine academies vary substantially. While our databases do not allow us to measure program components with a high degree of precision, we can approximate intensity of the academy experience for students with their number of "academy courses." Pursuing courses is only one part of an academy's curriculum,[2] and curriculum is only part of the academy experience, but it is arguably the single most important component. If we find that student outcomes are related to the degree of exposure to the program, minimum thresholds of student involvement may be necessary for the academy program to be effective. For this analysis, we trichotomize the distribution of the number of academy courses taken by academy students.[3] We note that students who were in the top third of this distribution had at least 20 academy courses, two courses shy of the fully prescribed complement for students who are in the program for three years.

STUDENT ACHIEVEMENT, SCHOOL, AND ACADEMY INTENSITY: INTERRELATIONSHIPS

Students' initial academic achievement, school environment, and program intensity may be interrelated in at least three ways. First, the academic achievement that students bring to the high school may determine the type of environment that develops. Some schools have an overall strong college preparatory program, which is often correlated with higher socioeconomic status of the students' families and academic achievements of entering students, as our discussion of tracking in Chapter 1 suggests. This interaction between initial academic achievements and school environment would be greater with school choice because high schools with stronger academic reputations will attract highly prepared students.

Second, both the school environment and the level of student preparation may affect the type of career academy program that develops. If school leaders are not particularly interested in career-related programs because of the perceived college-bound nature of most of their students, academies in their school might not focus on careers. We saw evidence of this in Chapter 3 with the slow development of the Performing Arts and Visual Arts academies at the higher socioeconomic status (SES) schools in the district. Conversely, if a school has a great degree of instability and number of students from troubled families, the academies might emphasize building social support and confidence in students. This is consistent with the proliferation of career academy programs at the more dysfunctional high schools in our district. Finally, the intensity of the academy program can influence the school environment and the achievements of entering students. For example, if word spreads about the programs' status and effectiveness, students who want the more complete program will be attracted. This "new" student clientele will alter the school environment.

The interactions make it difficult to pinpoint the source of the differences in the career academy's ability to build knowledge and skills.

While our sample of nine academies in six different schools does not allow us to ferret out all of these effects, we untangle some of them, in part, by examining how much they are interrelated. Table 5.1 shows the percentage of students in each school and academy and the amount of course work taken ("All students," column 2) and compares how each triad of students, with respect to initial achievement, is distributed (columns 3–5, "Math" and columns 6–8, "English"). For example, HS3 has 4.5 percent of the students in the district but only 1.8 percent of the highest achieving math students at program entrance.

We find that the level of student achievement is not randomly distributed across schools or across academies. One high school (HS6) contains a disproportionately large percentage of the top students (in 10th grade), while two high schools (HS1 and HS3) have a disproportionate percentage of the lowest-achieving students. This distribution is generally correlated with the socioeconomic status of the high school's attendance areas. HS3 and HS1 draw students from families in areas with the lowest income, HS2 and HS5 are in a middle group, and HS6 and HS4 are in the upper third.

Table 5.1 also shows us that, taken as a whole, the city's career academies disproportionately enrolled students with higher test scores (see rows under "Academy").[4] Although 80.5 percent of all students were not in an academy, only 76.2 percent of students in the highest math triad and 74.8 percent in the highest English triad were not in an academy. This means that academy students were disproportionately represented among students with the highest math and English achievement test scores. However, these trends do not hold for all of the academies, and they are related to characteristics of the schools. For example, the Business and Law academies, both of which are located at HS3, enroll a disproportionately large percentage of the lowest-achieving students in both math and English, while the Engineering and Performing Arts academies enroll a disproportionately large percentage of the top students in math and English at program entrance.

For academy students, the initial level of achievement also interacts with how much academy course work they take (Table 5.1). Students with the highest scores at program entrance are somewhat more likely to take a full load of academy courses than are students with the lowest achievement scores. For example, 37.3 percent of the high math achievers at program entrance take a nearly complete academy course load. Nearly 4 percentage points fewer students in the bottom third of the math achievers take a nearly full course load. This suggests that the better-prepared students at program entrance are more likely to undertake a more complete academy program than are less-prepared individuals.

The interrelatedness of career academy and achievement at program entrance and amount of academy course work is shown in Table 5.2. From this table, we see that the initial achievement of students differs among the schools, with variations related to socioeconomic status. The school with students from the highest SES (HS6) contains a disproportionate percentage of the district's students with the top scores at program entrance, while schools with students from the lowest SES areas (HS3 and HS1) have a disproportionate percentage of lower-achieving students. The proportion of students in an academy and the intensity of the academy experience, as measured by courses taken, also differ among schools and are inversely related to socioeconomic status. Over half of the students at HS3, by far the smallest high school in the city, are in an academy, while less than 10 percent of students at HS4 and HS6 are in an academy ("Academy"). Finally, the range in the amount of academy course work taken is large. In three schools, over 50 percent of the academy students take a nearly complete academy course load. In two schools, fewer than 10 percent have the full load, with no one at one school having a complete course load. Not surprisingly, the schools with the lowest percentage of students taking a full academy course load were the two without a full curriculum.

The difference across schools is seen in more depth by estimating the influence of initial academic achievement and demographics on enrollment in an academy in each school (Table 5.3). Results show that initial academic achievement is positively related to enrolling in a career academy only at certain schools. Academies at HS1 (Computer and Trade and Transportation), HS5 (Engineering and Health) and HS2 (Media) enroll students with greater-than-average academic abilities in 10th grade.[5] These schools are in the middle of the SES continuum. Although HS1 draws students from extremely low backgrounds, it is not considered by the district as one of the most dysfunctional schools. There are several reasons why schools enroll students in career academies at different achievement levels. One is what is commonly called

Table 5.1 Differences in Student Characteristics by 10th Grade Achievement Levels[a]

		Math			English		
	All students	High	Middle	Low	High	Middle	Low
School (% enrolled in)							
Lowest SES high schools							
HS3	4.5	1.8	5.3	6.5	2.5	4.5	5.6
HS1	14.6	6.2	16.4	21.6	7.1	14.4	18.9
Middle SES high schools							
HS2	21.5	12.5	23.6	28.7	11.7	22.7	26.1
HS5	14.1	16.5	14.8	10.9	17.2	14.9	11.8
Highest SES high schools							
HS4	22.8	27.6	19.7	21.0	22.1	21.1	24.4
HS6	22.5	35.4	20.2	11.3	39.4	22.4	13.2
Academy (% enrolled in)							
Not in an academy	80.5	76.2	79.1	86.4	74.8	79.2	84.5
Business	1.7	1.0	2.3	1.9	1.1	2.0	1.9
Computer	2.8	2.4	3.5	2.7	2.5	3.6	2.5
Engineering	2.9	7.0	1.3	0.3	6.4	1.9	1.6
Health	3.0	3.9	3.9	1.1	4.5	3.5	1.8
Law	1.7	0.7	2.2	2.2	0.8	1.6	2.2
Media	2.6	3.0	3.0	1.8	3.1	4.0	1.5
Trade & transportation	1.3	0.5	2.1	1.5	0.9	1.2	1.7
Visual arts	1.5	1.9	1.3	1.3	1.5	1.7	1.4
Performing arts	1.9	3.5	1.4	0.7	4.4	1.4	0.9
Other academy[b]	0.1	0.0	0.2	0.1	0.0	0.0	0.3
Amount of academy course work (% academy students who fall into)[d]							
Highest third	36.7	37.3	38.0	33.7	38.6	38.4	33.7
Middle third	29.5	29.9	28.6	30.1	27.9	31.2	29.4
Lowest third	33.8	32.8	33.3	36.3	33.5	30.4	36.9

(continued)

Table 5.1 (notes)

SOURCE: Data are from the three cohorts of students in the City Student Database (1990–97).

[a] Triads for math and English are based on the distribution of 10th grade test scores for the public school population. Developing a single triad was impossible because only 38.4 percent of the students fell into the same triad on math, reading, and language tests. The lowest math triad contains the bottom third of students (scores up through the 18th percentile). The middle math triad contains the middle third of the population (scores from the 19th through 64th percentile) and the top math triad contains the top third of the population (scores in and above the 65th percentile). Triads in English were developed from the distributions on the reading and language test score (ranging from 20 to 48 cutoffs in language and 18 and 46 in reading). If students fell into the bottom triad in either language or reading, they were placed in the lowest English triad. If students fell into the top triad on both distributions, they were placed in the top English triad. Remaining students, all of whom had at least one middle triad score and no score in the lowest triad were placed in the middle triad. Totals may not equal 100 percent due to rounding.

[b] Other academies include Architectural Design, Future Teachers, and Environment. While district records indicate that 0.1 percent of the students were "enrolled" in these academies, their start date in 1993 was too recent to include our study cohorts.

[c] These percentages differ from those in Chapter 3 because they are based on the sample of survey respondents. While the number of students in academies is greater here because survey response rates were high to academy students, the general trends cited are the same as those presented earlier, which were based on the population of students.

[d] The triads for academy course work were developed from the distribution of academy courses undertaken by academy students. Academy students who had fewer than 12 academy courses fell into the lowest third. Academy students who had between 12 and 19 academy courses fell into the middle third, and those who had over 19 courses fell into the top group.

Table 5.2 Differences in Student Characteristics by High School

	All students	HS3	HS1	HS2	HS5	HS4	HS6
		Lowest SES		Middle SES		Top SES	
Achievement (sophomore year) % students who fall into:							
Highest math	34.1	13.9	14.4	19.8	40.0	41.2	53.9
Middle math	32.9	38.7	36.8	36.1	34.5	28.4	29.5
Lowest math	33.0	47.4	48.8	44.1	25.5	30.4	16.6
Highest English	25.0	13.9	12.2	13.6	30.6	24.2	43.9
Middle English	29.3	29.4	28.8	30.9	31.1	27.1	29.2
Lowest English	45.7	56.7	59.0	55.5	38.3	48.7	26.9
Academy							
% in an academy	19.5	68.4	29.2	12.8	40.3	7.5	9.1
Amount of academy course work (% academy students who fall into):							
Highest third	36.7	54.9	21.1	53.8	51.8	8.1	0.0
Middle third	29.5	24.8	40.2	23.1	24.5	51.4	18.2
Lowest third	33.8	20.3	38.0	23.1	23.7	40.5	81.8
N	4,315	194	631	928	608	985	969

SOURCE: Data are from the three cohorts of students in the City Student Database (1990–97).

Table 5.3 School Differences in the Selection of Students into Academies[a]

	HS3	HS1	HS2	HS5	HS4	HS6
	Lowest SES schools		Middle SES schools		Highest SES schools	
Achievement (sophomore year)						
Reading percentile	0.001	–0.003	0.005	0.001	–0.003	–0.001
Language percentile	0.002	0.008**[b]	0.007**	0.010**	–0.003	0.006
Math percentile	0.004	0.009**	0.005**	0.012**	0.002	0.006
Demographic						
Male	–0.275	–0.201*	–0.257**	0.098	–0.042	–0.054
African American	1.453**	0.717	0.378	0.157	0.252	–0.012
Latino	2.293**	0.368	0.850**	0.557	0.467	0.010
Asian	2.445**	0.711	0.391	0.749**	0.015	–0.395**
Special education student	–0.770**	–0.437	–0.660	–0.325	–0.365	0.183
Limited English proficiency	–0.647	–0.548**	–0.426**	0.054	–0.347*	–0.258
N	187	629	922	581	983	916

SOURCE: Data are from the three cohorts of students in the City Student Database (1990–97).

[a] Relationships are based on estimated coefficients from probit analyses in which the dependent variable is academy status and represent significant changes in the probability of being in an academy in each high school. The full results of the estimations are available from the authors. Separate equations were estimated for each school with the academy binary variable the key independent variable. The omitted categories on the race variable are white, Pacific Islanders, and Native Americans.

[b] ** = significant at $p \leq 0.05$ level.

* = significant at $p \leq 0.10$ level.

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"creaming" of higher-achieving students through directed recruiting or implicit entrance standards.[6] A second possibility is tied to students' or parents' perceptions of a program. Either group may have heard that a given academy is tailored to strong students, or that the rest of the school is not good for those who wish to go on to university, or that one academy is markedly different from another at the same school.[7] A third possible factor is that the academies play a very minor role (see Table 3.2) in the two most scholastically oriented facilities (HS4 and HS6), and that these schools offer stronger academic programs than do the other schools.

All of the analysis thus far suggests that the solid interrelationships between academy, student achievement, and high school characteristics may influence the academy's ability to build knowledge and skills taken from high school. We examine this by stratifying our multivariate analysis (Table 5.4) by achievement at program entrance, high school, and amount of academy course work taken. We discuss the career academy's influence on skills taken from high school for students in each of these relatively homogeneous groupings (i.e., within each achievement grouping, high school, or level of course work) and then consider the interrelatedness of these groupings. Note that, in contrast to the presentation in other tables, Table 5.4 provides equation estimations by row, not by column.[8]

Students' Level of Academic Preparation: Achievement in 10th Grade

If the academy model is to help a wide range of individuals, those who are "at-risk" of school failure when entering high school and others who are doing better, it should address a diverse population of students. This is a major challenge, which has traditionally been avoided by high schools that maintain literal or *de facto* tracking of students by indicators of ability. The goal for the model is to bring students who are achieving below grade level up to the point where they can succeed. At the same time, the academy must maintain the interest and high performance of students who have done well prior to program entrance and who would, without a school-to-work program, take an advanced college preparatory curriculum.

The teaching and learning pedagogy in which the career academies are grounded is designed to meet the needs of all students, as Chapter 1 discussed. It is developed to offset the consequence of tracking, in which high-ability-grouped students gain in test scores while low-ability-grouped students lose (Kerckhoff 1986). However, under this pedagogy, students learn by drawing from existing knowledge to construct new knowledge. One critique often voiced about the constructivist approach is that a knowledge threshold must be reached before students can effectively construct additional knowledge (e.g., Reynolds, Sinatra, and Jetton 1996). If this is the case, the constructivist learning within a career academy might not suit students without sufficient levels of academic knowledge and skills when entering high school.

We examine, through a multivariate analysis, whether the academies increase knowledge and skills taken from high school for students at different levels of initial achievement (Table 5.4).[9] By stratifying estimations by achievement grouping, we examine the career academy's impact on knowledge and skills taken from high school for students with somewhat equal achievement levels brought to high school.[10] We see that the career academies in general ("Academy" column) increase knowledge and skills in high school for students of all English achievement levels. However, differences in the academy's influence existed for students with distinct levels of math achievement, and these differences varied systematically by the school in which the academy was housed.

Our results show that the program built knowledge and skills at six of the nine sites for five out of six achievement groupings and four out of six groupings in another academy. The academy did not increase knowledge and skills for students at schools in the highest SES (HS4 and HS6) or overall for students with the lowest level of math skills at program entrance. These differences are consistent with each academy's and school's history, relative strengths, and resources (Chapter 3). The sharp contrast of the generally positive impact of academies with the results at HS6 and HS4 is consistent with their much less extensive program, "arts" focus, and more limited academy resources. Interestingly, the academies with skill gains for low-achieving math students at HS5 also have, overall, a disproportion of higher-achieving students at entrance (Table 5.1). Whether the teachers and directors of the program recognize a limitation and act upon it, or whether the pro-

Table 5.4 The Impact of an Academy on Knowledge and Skills Taken from High School: Differences by School and 10th Grade Achievement Levels[a] (estimated coefficients)

		HS3		HS1		HS2	HS5		HS4	HS6
	Academy	Business	Law	Computer	Trade & trans.	Media	Engi-neering	Health	Visual Arts	Performing Arts
Achievement[b] (sophomore year)										
Highest math	0.211**[c]	0.277**	0.097	0.525**	0.724**	0.200**	0.254**	0.231**	−0.034	−0.022
Middle math	0.228**	0.215**	0.348**	0.446**	0.285**	0.129**	0.184**	0.159**	0.041	0.012
Lowest math	0.196	0.286**	0.243**	0.311**	0.352**	0.118	0.090	0.114	−0.117	0.069
Highest English	0.214**	0.475**	0.398**	0.575**	0.396**	0.223**	0.204**	0.162**	0.076	−0.001
Middle English	0.188**	0.180**	0.255**	0.393**	0.483**	0.123**	0.175**	0.194**	−0.133	−0.094
Lowest English	0.239**	0.229**	0.254**	0.393**	0.333**	0.123*	0.303**	0.242**	−0.016	0.101
School[d]										
Lowest SES schools										
HS3	0.353**	—[e]	—	—	—	—	—	—	—	—
HS1	0.219**	—	—	—	—	—	—	—	—	—
Middle SES schools										
HS2	0.048	—	—	—	—	—	—	—	—	—
HS5	0.217**	—	—	—	—	—	—	—	—	—

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Highest SES schools										
HS4	0.030	—	—	—	—	—	—	—	—	—
HS6	0.029	—	—	—	—	—	—	—	—	—
Amount of academy course work										
Highest third	0.300**	0.351**	0.385**	0.453**	0.392**	0.170**	0.309**	0.275**	0.086	Note f
Middle third	0.194**	0.171**	0.076	0.422**	0.429**	0.204**	0.206**	–0.011	–0.014	–0.013
Lowest third	0.127**	0.138	0.122	0.406**	0.171	0.039	0.131**	0.120	–0.108	0.004

SOURCE: Data are from the City Student Database (1990–97).

[a] Relationships are based on coefficients estimated from test Eq. 2.1, in which the dependent variable is the individual's GPA minus the school's average GPA. Full results of the estimations are available from the authors. Equations were stratified by achievement triad, school, and academy course work and estimated under two specifications. One specification included the academy binary as an independent variable (column 2), and the second specification included binary variables for each individual academy (columns 3–1).

[b] See Table 5.1 for a definition of the triads on achievement. The comparison group for this estimation is all nonacademy students in public schools.

[c] ** = significant at the $p \leq 0.05$ level.

* = significant at the $p \leq 0.10$ level.

[d] The comparison group in the (stratified) estimations by school is nonacademy students in each particular school.

[e] A dash means that the equation was not estimated.

[f] The variable cannot be entered into the estimation (no students at the Performing Arts Academy fell into the top third of number of courses taken).

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gram developed in ways that systematically excluded low-achieving math students, is a question that must be addressed if academies are to serve all kinds of students. Whether this imbalance is inherent to building or sustaining academy programs cannot be discerned with our data but should be explored before assuming the advantage of the academy program "for all students."

School Environment

Career academies were established in this city, in part, to insulate students from the sometimes tumultuous and alienating social climate and bureaucratic systems of the overall high school. By building a "school-within-a-school," the career academies were designed to raise the level of achievement of their students. However, the school's organizational structure and leadership can enhance or impede program development and implementation. Education literature is replete with evidence that contextual differences in schools affect the average achievement level of students through teaching and learning environments (e.g., Rutter 1983; Purkey and Smith 1983 provide a review).[11] These factors include such processes as site management, instructional leadership, staff stability and development, curriculum organization, parental involvement, school reputation, and effectiveness of learning time. Perhaps not surprisingly, these differences are often linked with socioeconomic status of students' families, which may produce community expectations about academic performance, outcomes from education, peer interactions, and teacher expectations.[12]

We examine the career academy's ability to build knowledge and skills in different school environments by stratifying estimations by school. Such estimations build a comparison group of nonacademy students at the same school. We see that the career academy program does not increase knowledge and skills in all high schools (Table 5.4, "School"). Academies at one middle-level SES school (HS2) and at the two high-SES schools (HS4 and HS6) do not improve skills for their students as compared to nonacademy students at their school. In contrast, programs at the lowest SES schools (HS3 and HS1) and at one middle-level SES school (HS5) increase knowledge and skills above levels achieved by students who were not in an academy.

The insignificant impact of the career academy programs at HS4 and HS6 is not surprising. These schools contain students from the highest SES families in the district and have underdeveloped programs devoted to the "arts." However, these factors cannot explain the insignificant impact of the Media Academy at HS2, which is one of the district's oldest and best established. In fact, this insignificant result appears to contradict the finding in Chapter 4 that the Media Academy showed an ability to increase knowledge and skills. However, the analysis in Chapter 4 was an aggregate one in which all of the city's non-academy students were the comparison group. It may be that HS2, in general, does an above-average job of building knowledge and skills in its students. Although the Media Academy has flourished at this school, so might other, more traditional programs.[13]

The inherent difficulty in building or sustaining academy programs in different environments cannot be discerned with our data. However, our results raise a number of questions along these lines and suggest that these factors should be examined before developing a career academy program. Administrators may have the ability to inhibit program development (as in the case of the high SES schools in our study) in response to parental or other political pressures. Conversely, site administrators may be able to develop more complete programs, leading to effective academies in a wide variety of settings.

Exposure to the Academy Curriculum

No matter how much positive peer support or how many different work experiences are provided to an academy student, taking its designed courses would seem to be the most basic part of an academy education. In the academy model, a new curriculum has been formulated, one that, in theory, encompasses two-thirds of a student's high school course work. The curriculum is intended to link the courses to each other and to the themes of the career, industry, or profession of the academy. An academy student who misses many of these courses would seem to have missed the heart of the program.

As Chapter 3 has shown, not all academy students experience the same degree of exposure to the curriculum. Presumably, students who are in academies but who do not receive a full academy curriculum take more traditional course work in its place. It, therefore, might be fair to presume that the academy's ability to build knowledge and skills in high school will be higher where exposure to the academy's curriculum is greatest.

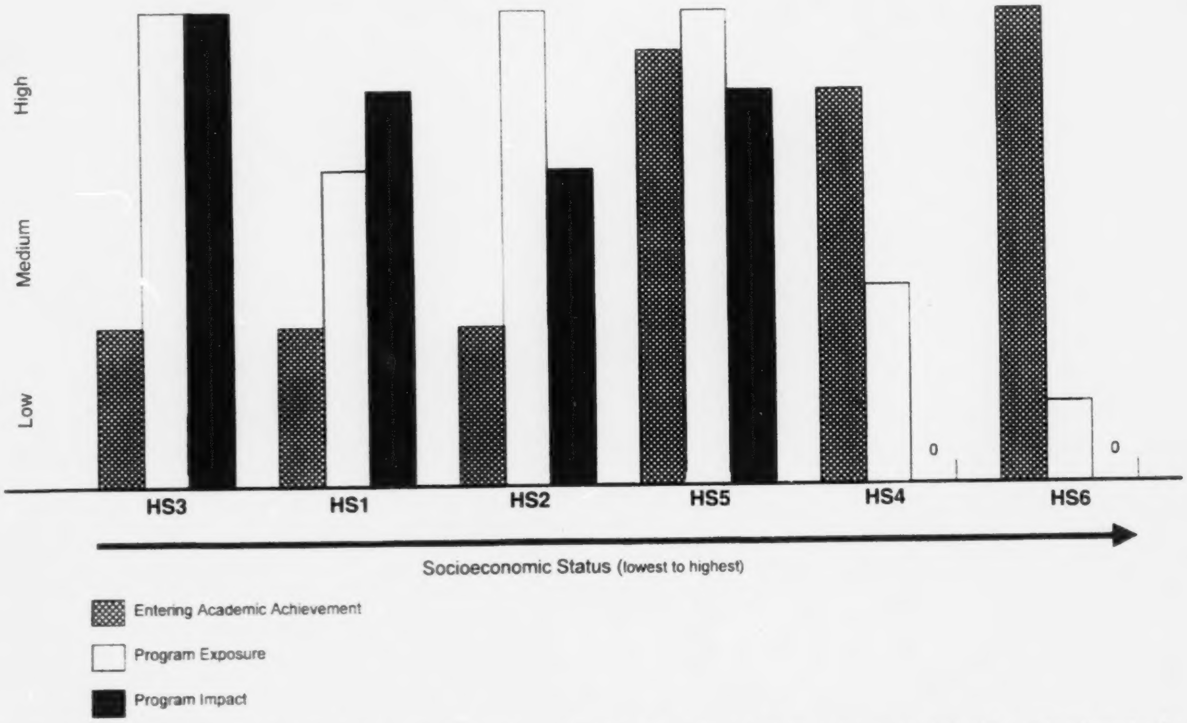
We support this proposition with estimations stratified by level of academy curriculum (Table 5.4, "Amount of academy course work"). More academies build knowledge and skills in high school for students undertaking a (nearly) full academy course load (seven of eight cases) than for students with a mid-range (five of nine cases) of classes or few (two of nine cases) academy courses. In addition, the coefficient estimates on the binary academy variable rise from 0.127 to 0.194 to 0.300 as course work increases.[14]

These results suggest that taking courses matters. A substantial academy curriculum is essential to building knowledge and skills in high school. Only two academies—Computer and Engineering—increase knowledge and skills in high school if their students have fewer than 12 courses (the lowest third). In contrast, all academies enhance knowledge and skills for students who have at least 20 academy courses, except the relatively incomplete Visual Arts and Performing Arts academies that rarely, if ever, offered that many courses.

SUMMARY AND DISCUSSION

The student's level of initial achievement, the school environment, and the student's exposure to the academy's curriculum all influence the career academy's ability to build knowledge and skills in high school. Perhaps most importantly, our results suggest that these factors may be interrelated, as Figure 5.1 shows. Three conclusions are illustrated. First, schools with students of higher SES background also have students with higher entering levels of achievement. This is consistent with the literature cited in Chapter 1 that details students' stratification across schools. Second, schools with the lowest-achieving students at program entrance and the lowest SES background generally have the programs with the highest degree of program exposure, while schools with the highest-achieving students at high school entrance and the highest SES background generally have the lowest degree of program exposure.

Figure 5.1 **School Differences in the Entering Student Achievement Level Exposure to Academy Curriculum, and Impact of the Academy Program**



NOTE: Data are from the three cohorts of students in the City Student Database (1990–97). The level of entering academic achievement was imputed from math and English triads. Program exposure was imputed from academy course work. Program impact was imputed from the number of significant impacts that were shown in Table 5.4.

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Finally, the exposure to the academy's program appears to be a necessary, but not sufficient, condition for increasing knowledge and skills in high school. Both school environment and the achievement levels of entering students intercede. Fewer students in the schools in the highest SES areas are exposed to a full academy program. These results suggest that the differences in the academy curriculum undertaken are not random. Rather they interact with the completeness of the curriculum being offered and with factors in the school environment, which were detailed in Chapter 3.

These interrelationships necessitate examining the context in which a program operates in order to understand its outcomes. Career academies at the two schools at the low end of the SES spectrum increased knowledge and skills taken from high school across all achievement groupings. These positive program outcomes were achieved during a period in which the schools had a great deal of administrative turnover, safety problems, and generally frustrating turbulence.[15] HS1, for example, had many of its buildings out of commission for several years during an extremely drawn-out process of rebuilding. HS3, with its small student body and teaching staff, had four principals in seven years, and was continually absorbing (but not always benefiting from) new reform strategies, intense criticism, and on occasion, threats of closure. Academies at these schools may not always have shown the same robust academic results in absolute terms as less troubled campuses. However, they did demonstrate positive impacts for students relative to their overall school populations.

At the opposite end of the SES spectrum, we see that the Visual Arts (at HS4) and the Performing Arts (at HS6) academies did not increase knowledge and skills taken from high school for any group of students, consistent with results that were presented in Chapter 4. These schools have a "college prep" framework of expectations and parental, district, and city resistance to full-fledged academy support. These two programs, especially Performing Arts, were much more limited to the arts activities and classes, rather than directed to a full, integrated curriculum. The lack of attention and resources to these academies was in part imposed by the schools and in part the result of their relatively favored circumstances. Principals and parents were wary of curriculum innovations that threatened to be a vocational distraction from the central college preparatory mission of their schools.

In any event, city redevelopment agency (CRA) financial support and other government grants were based on socioeconomic need or on the direct relevance of the academy's focus to the labor market. These two factors caused HS6 to be passed over for funding during the study period and HS4 to be passed over during its first several years of operation.

The academies at schools drawing from the middle strata of the city's public school population—in Engineering, Health, and Media—are three of the oldest and best-established academies in the district.[16] These academies helped students in at least four out of six categories of achievement, but did not increase knowledge and skills taken from high school for the lowest-achieving math students. The rigorous math-based curriculum of the Engineering Academy might explain this, and it suggests that the "bridge" function of bringing students in with lower-than-usual levels of math had not yet been successful.

In general, academy directors have reported that mathematics is usually the hardest subject to incorporate with the rest of the program on a consistent basis. The Engineering Academy is an exception, since the core curriculum is based partly on integrating geometry, physics, and computerized drafting. The challenge is not because math does not lend itself to application in a variety of contextualized learning projects, for clearly it does, especially in academies related to sciences, computers, and other technology. However, wherever the students are diverse in their levels of preparation, this variation is likely to appear in their mathematics skills at entrance. Since math courses require sequencing, low-achieving students are often programmed into math classes outside the academy. It seems plausible where math is not directly affected by the academy teachers, curriculum, or even peer support, students with the lowest-achievement levels in math might be more disengaged from the academy overall.

In sum, the career academy strategy may not be appropriate in all high schools or for all students. Some environments may not be hospitable for academy development, and academies may evolve distinctly within the same environment because the students or funding sources differ. The reasons for these variations lie beyond the data presented here and suggest that further research on both student achievement and institutional development should be undertaken. The findings raise questions about the circumstances under which these ambitious programs can flourish, and whether or not there are groups of students for whom the approach may not be either motivational or otherwise effective at improving their academic performance. In our concluding chapter, we examine more extensively these questions of program design, educational policy, and future research.

Notes

1. Triads for math and English are based on the distribution of 10th grade scores in math, reading, and language for all students taking the tests. Developing a single triad that represented a uniform percentile range was impossible because only 38.4 percent of the students fell in the same triad group in math, reading, and English. The lowest math triad is defined as containing the bottom third of students (scores up through the 18th percentile); the middle math triad as containing the middle third of the population (scores from the 19th through 64th percentile); and the top math triad the top third of the population (scores in and above the 65th percentile). Triads in English were developed from the distributions of the reading and language test scores (ranging from 20 and 48 cutoffs in language and 18 and 46 in reading). Students falling into the bottom triad on either language or reading were placed in the lowest English triad. Students falling in the top triad on both distributions, were placed in the top English triad. Remaining students, all of whom had at least one middle triad score and no score in the lowest triad, were placed in the middle triad.
2. Integrated projects, which link work-based learning activities and school-based learning, and course integration are also key segments of the curriculum. Unfortunately, we cannot separate out these different parts.
3. The triads for academy course work were developed using the distribution of the number of academy courses taken by academy students. Academy students with fewer than 12 academy courses formed the lowest triad; academy students with between 12 and 19 academy courses formed the middle triad, and those with over 19 courses fell into the top triad.
4. Recall, of course, that special education students are included in the sample.
5. The differential entrance of students into academy programs could create estimation biases when examining the impact of the academy on building knowledge and skills in high school. This bias is reduced by restricting analysis to students with somewhat equal levels of initial academic achievement, as we do in the next section.
6. The extremely high math scores of the Engineering students at HS5 support this contention (data not shown here). To counteract this and to increase the diversity of the program, there has been a bridge program with this academy for ninth graders who want to improve their math performance and then enter the academy.
7. According to the Health Academy director, this was a serious issue at HS5, with the Health Academy having a lower status academic reputation compared to the

Engineering Academy for several years in the early 1990s. Both academies, however, served as magnet programs within the district because of their strong reputations.

8. For example, the effect of being in a career academy across achievement levels can be seen by looking down the "Academy" column in Table 5.4, whereas the effect of being in an academy on work and school outcomes is seen in the "Academy" row in Table 4.2.
9. As in Chapter 4, knowledge and skills taken from high school are quantified as the individual's GPA minus the average GPA in the school.
10. Stratifying by achievement grouping better controls for unobserved heterogeneity differences between academy and nonacademy students that could bias estimations. This minimizes the differences in unobserved heterogeneity in characteristics related to motivation (for example) because both academy and nonacademy students within the estimations have similar levels of achievement and motivation. Controls for achievement that is not part of the stratification are inserted into each equation (e.g., math scores in the English equations and reading and language scores in the math equations).
11. Of course, this line of research contrasts with the findings of Coleman et al. (1996) and Rowan, Bossert, and Dwyer (1983), who argue that schools account for a small variation in student achievement.
12. See Willms and Raudenbush (1989), Erbring and Young (1979), and Willis (1977) for discussion. In light of these contextual differences in schools, it is somewhat surprising that research on the impact of high school quality on labor market earnings is mixed (e.g., Hanushek 1989, 1997; Grogger 1996; Hedges, Laine, and Greenwald 1994; Card and Krueger 1992a, b; Betts 1995). One explanation for this seeming paradox might be that the contextual differences that combine with learning styles to account for variations in individual student achievement, *ceteris paribus*, arise with different demographic compositions of student bodies (e.g., Lee and Bryk 1989). Because the distribution of demographic groups varies across schools (Rumberger and Willms 1992), the teaching styles used in conjunction with a particular racial and ethnic composition in the school may differ from an individual's learning styles. One example of this potential disjuncture between teaching and learning styles lies with the advocacy of an Afrocentric curriculum for African-American students (e.g., Watkins 1993).
13. In fact, HS2 was, during the period of the study, implementing a schoolwide restructuring plan that divided the entire campus into thematic "houses" (of which the Media Academy was one) and began a process of integrating curriculum and other reforms. Some of these changes were consistent with the academy model and some were not. While it would be reaching beyond our data to affirm with any certainty that schoolwide restructuring accounted for this empirical finding, it is an intriguing possibility.
14. Coefficient estimates are significantly different ($p \leq 0.05$) as determined by a t-test.

15. The Law Academy did not increase knowledge and skills taken from high school for the highest-achieving math students, a particular finding for which no ready explanation presents itself, especially since students in all five other categories of achievement did benefit.
16. Academies at HS5 also faced some significant impediments at the site level, but these were not as prolonged or as serious as at HS1 and HS3. These academies were extremely well-funded, compared to most of the others, and are an integral part of the school. It is not surprising that they show significant impacts on skills obtained.

6

Summary and Policy Conclusions

Reform movements seem to be an ever-present feature of education. Yet, the questioning of accepted ways of teaching and structuring schools is necessary if the system is to engage in continuous quality improvement. The challenges currently posed to high schools are daunting. Students need to be better prepared to succeed in higher education, in the workplace, and in society, and traditional curricula appear to be ineffective for many if not for most of them. School-to-work reforms have emerged in response to this perceived shortcoming.

With the proliferation and diversification of school-to-work programs comes increased scrutiny. After all, taken to heart, these are fundamental changes to the basic curriculum and organizational culture of high schools. If school-to-work strategies are widely implemented, they will displace existing programs and require considerable resources and significant retraining of many teachers. The stakes are high, and the best time to ask tough questions about their potential is now, when school-to-work strategies are relatively new.

This is the spirit of our research. The central question of the inquiry is "In what ways do school-to-work programs reform urban high schools to increase education and workplace skills?" Findings and recommendations from our study should help policymakers and educators better understand the strengths and limitations that characterize one of the most prominent school-to-work education reforms today—the career academy. In this chapter, we summarize our findings, discuss the key policy implications, and speculate on research that remains to be done on these issues.

The move to integrate academic and vocational learning, which lies at the heart of school-to-work reform efforts, is motivated by current demographic and economic trends. Huge disparities exist between the earnings and employment opportunities of the well-educated "haves" and the less-educated "have-nots." Global economic competition has intensified the demand for skilled workers in the United States and has fueled concern, if not indignation, that U.S. students consistently score lower on academic achievement tests than do their counterparts in other countries. The gaps in both employment-related skills and academic achievement are widely attributed to the failure of public schools, particularly those in the inner city, to motivate students and to provide them with the knowledge necessary to become successful in the workplace.

School-to-work reforms attempt to encourage students to achieve academic excellence by providing a work-related context for learning and by setting high educational standards. In theory, by showing students that employment in high-wage, interesting jobs is possible, individuals who were previously alienated from school will see the relationship between their studies and a successful life. This, in turn, will intensify their inclination to stay in school and to learn the course material. School-to-work reforms also dictate that course materials are set with high standards instead of at a norm of mediocrity. The greater motivation and standards combine to provide students with the knowledge and skills necessary to compete in global, national, and local labor markets. Because school-to-work reforms are new, this line of reasoning has not been subject to much rigorous longitudinal evaluation.

The career academy is the school-to-work program model that is, arguably, best developed. The academies build a school-within-a-school, integrate academic and vocational learning into a specific career or industrial focus, and create a cohort of students who take four core classes with a small group of teachers so that a strong emotional, social, and academic support system isolates and "protects" students from an alienating, ineffective school. In this model, the social support and career focus combine with an integrated, academically rigorous curriculum to prepare students for a range of postsecondary endeavors.

There are, of course, discrepancies between the career academy model that policymakers design and programs that are implemented. For one thing, all school-to-work models break new ground in teaching techniques, and inevitably require time and commitment for educators to adapt the concepts to their specific situations. For another, the academies redesign many features of a school and take additional financial and human resources. Because changing the structures in which career academies operate is required, the school environment can prevent or limit implementing the program model. In fact, sometimes the largest tional reform, we pursued the career academies' development as they grew from 4 in 1988, to 9 in the period from 1990 to 1993, to 12 by 1994–1995, the last year our research cohorts were in high school.

SUMMARY OF FINDINGS

The school district's desire to pursue academic excellence through the school-to-work approach was expressed in the model illustrated in Figure 3.4. In theory, the career academies were expected to directly raise student's performance in four ways.

1) They would increase academic knowledge and skills that the student takes from high school.
2) They would intensify the student's motivation to continue on to higher education by conveying its necessity in today's labor market and by deepening the student's understanding of the connection between academic courses and the world of work.
3) They would increase employment and wages by building useful workplace knowledge while in school.
4) They would enhance and encourage receptivity to lifelong learning through contextual teaching about the changing requirements of the labor market. Academies were also expected to elevate students' postsecondary performance indirectly by building their knowledge and skills, which would increase the ability to continue on to higher education and improve their productivity and earnings in the labor market. While virtually all school-to-work programs have greater education as a goal, it was especially important in the academies studied here.

Our work revealed several discrepancies between the district's model and the actual student outcomes. These differences centered around two themes. First, our quantitative analysis showed that the outcomes and pathways by which academies facilitated postsecondary success varied from those outlined in Figure 3.4. The key difference lies in the indirect nature of the academy's ability to achieve success barriers to change are not major ideological disagreements, but more mundane facts of school life such as bell schedules and seniority clauses in union contracts.

Within the confines of a single school district, we examined the potential of the career academies program for educational reform along two lines. First, we assessed their capacity to develop and to be implemented within an urban, public school environment. Second, we appraised their ability to facilitate postsecondary success for students. Academies that operated in our district represent the full range of development as they exist and are likely to exist if school-to-work models are implemented. The district also contains a full spectrum of school environments, including facilities that readily embrace and advocate the academy model and those whose staff and parents are wary of its adoption. This district therefore provides substantial diversity in which to evaluate the potential for career academies to develop and be implemented. The school district that we studied has committed to the academy model as the vehicle for an educationally focused school-to-work strategy. Not coincidentally, this approach is consistent with the broader systemwide restructuring efforts adopted by each of the last three superintendents since 1990. At the high school level, the career academies were the principal means for providing "a sequenced program of study that integrates academic and career-oriented curriculum and engages students in contextual and experiential learning" (district document). As a result, the city was one of the first school districts to establish career academies, beginning in 1985. New programs have started continually since that time, although they did not all have or acquire the same resources, for a variety of reasons. Our analysis of program development and implementation is based on career academies that were conceived in a highly structured districtwide model of program development but implemented under conditions of various levels of completeness, resources, committed staffing, and school support.

Within this environment, we assessed the high school experiences of a population of three cohorts of public school students, 14 percent of whom were enrolled in a career academy.[1] We followed this group of about 10,000 students through high school and their initial foray into either postsecondary education or the labor market. To assess the potential of career academies to develop and be implemented as educafor its students. We found that academies improve students' knowledge and skills, which then increases postsecondary education. We found little evidence of a direct, independent effect. Secondly, our qualitative analysis of career academy development and implementation suggested that the single model of program goals and academy operation developed by the district did not lead to career academies that operated in the same way. Instead, a great deal of variation existed in how the academy programs were implemented. This heterogeneity makes it difficult to define a common set of characteristics or results.

Student Outcomes from Career Academies and Pathways to Postsecondary Success

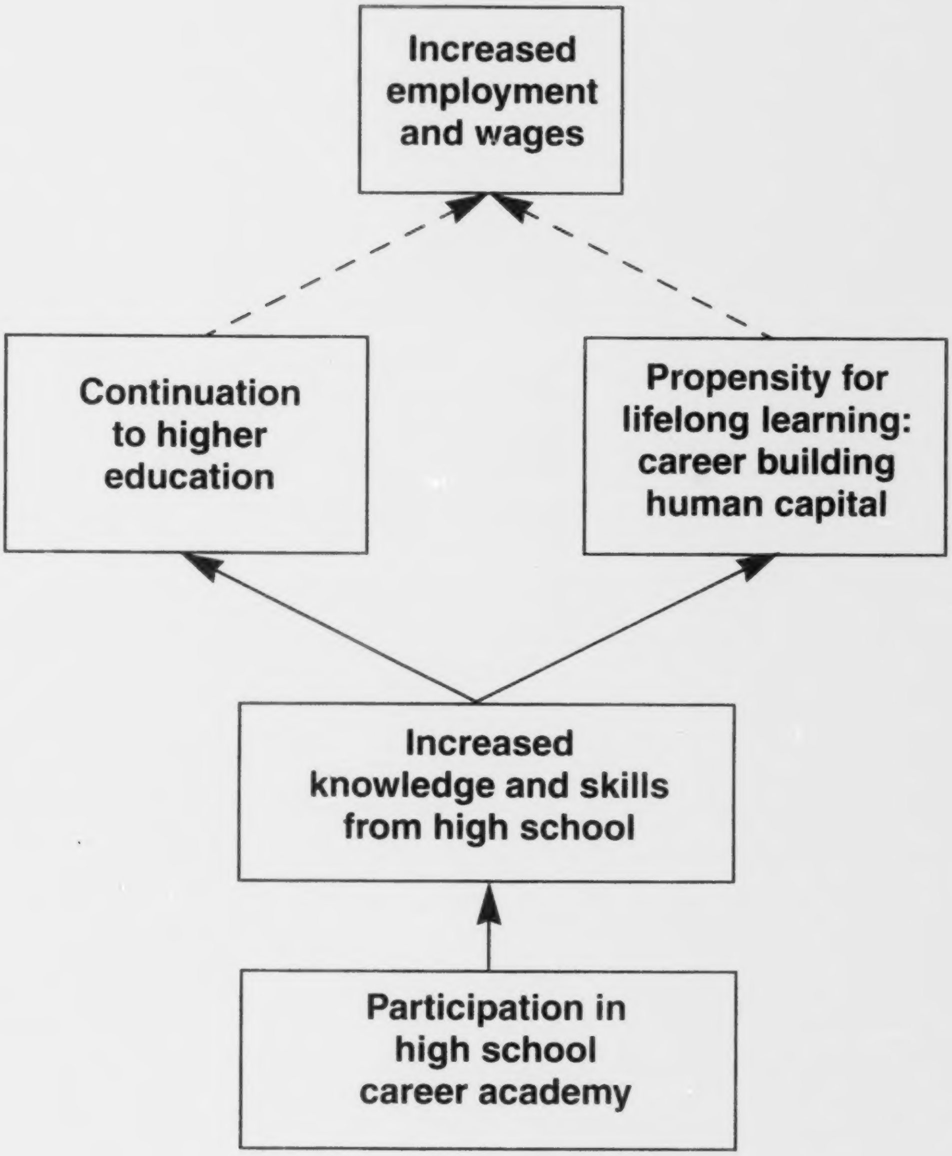
The model that was implemented in the schools had outcomes that differed from outcomes in the model developed in the district (Figure 3.4). In the district's model, the career academy directly enhances postsecondary success. Such independent effects existed in only a few cases however. In practice, as shown in Figure 6.1, the career academies promoted postsecondary success mainly by increasing the academic knowledge and skills that students took from high school, which raised students' probability of attending postsecondary educational institutions. This is no small achievement in and of itself, of course. However, the difference between the two kinds of impacts dictates an important cautionary conclusion about the potential of career academies.

- Career academies cannot substitute motivation and career exposure for hard academic skills. They must build academic knowledge and skills for students to succeed after they leave high school.

Motivation and career awareness may be valuable tools for getting students to learn but do not appear to be effectual in their own right. As we shall discuss later in the chapter, this has important implications for the design of curriculum and for the allocation of resources.

Our study also shows that the career academies have very little impact on employment and wages in the years immediately after students leave high school. This is inconsistent with frequently expressed national goals, and to a much lesser extent, with the local priorities in

Figure 6.1 The Impact of the Career Academies on Postsecondary Activities


Increased employment and wages
Continuation to higher education
Propensity for lifelong learning: career building human capital
Increased knowledge and skills from high school
Participation in high school career academy

NOTE: Solid arrows indicate an impact that was shown in our estimations. Dotted arrows indicate a presumed impact.

the city. School-to-work programs have often been touted as a means to provide local labor markets with the skilled workforce that businesses demand, to give students a variety of transferable skills within a particular career cluster, and (as a result) to raise wages and employment opportunities of students. Our research shows no evidence that currently operating career academy programs produce this outcome.

- Career academy students in general fare no better than their non-academy counterparts in employment or wages soon after they leave high school.

This conclusion might follow from the greater emphasis that our study site placed on pursuing postsecondary education. The programs did not have as many strong links for direct placement to jobs with specific employers or industries as did programs in some other cities. Nonetheless, the results might also follow from the nature of the youth labor market, in which individuals frequently make transitions between employment opportunities before settling into a specific work pattern or a "career." The lack of an immediate program impact on employment and wages should be taken as another caution to keep expectations in line with the actual local circumstances and with the behavior of youth.

Although the career academies in our study did not increase employment and wages in the near term for their students, they did significantly raise college attendance and the articulation of students from high school to postsecondary education.[2] This may ultimately improve other outcomes for students, since the route to better earnings and employment has always been through increased education. Results from our study suggest that the career academy may stimulate the potential ability for and interest in lifelong learning. If this were the case, we would expect job opportunities and wages of career academy students to rise throughout their working life as they acquire additional human capital. However, this increased learning is possible because the career academies gave students the ability to pursue postsecondary education through academic knowledge and skills.

Development and Implementation: Academy Heterogeneity in Structure, Capacity, and Outcomes

Not all academies demonstrated the same ability to enhance the knowledge and skills of their students.

- We found that the environment and circumstances surrounding the program, its degree of completeness, and the entering achievement level of students all determine whether the career academy increased academic knowledge and skills that students took from school.

Not surprisingly, we showed that academy students got more out of the program when they and the school put more into it. Two of the more developed academies not only raised the academic knowledge and skills of students, they also provided a positive social climate that independently lifted the probability of learning. These successful academies had several dimensions in common. They had strong community support, long-established funding sources, a well-developed curriculum that students actually took, and students who were capable of improving their skills to undertake the curriculum.[3] Other academies, with different inputs, were implemented in distinct ways and produced disparate results, including, in a few instances, none that were measurable.

We also found that the distribution of academies by student achievement at program entrance and by school was not random.

- While academy programs proliferated at the schools with the student populations from the lowest socioeconomic status attendance areas, the high schools with students from the middle of the city's socioeconomic strata housed the academies with positive outcomes in multiple dimensions, in part because strong programs were developed.

Within these strata of schools, the right mix of intense pressure for reform coexisted with teachers who had the creative ideas and leadership needed to start and build academies. Schools with student populations from the lowest socioeconomic strata, while fully embracing the academy model, provided school environs that proved to be extremely challenging for isolating students in a "school-within-a school" or for otherwise building a complete program. Schools with students from the highest socioeconomic service areas were slow to embrace the full academy model. The initial academies in these schools, with their strong college-prep traditions, had arts-focused themes and resisted implementing the work-based learning model.

Perhaps because the career academy programs were concentrated at lower socioeconomic status schools, academy students were not generally successful by national or local standards (i.e., CRA benchmarks) but were successful when compared against nonacademy students in their own schools. Evaluating program outcomes must therefore be placed in context.

- Academies that are seemingly ineffective when compared against national or local standards may be quite effective when compared to current educational outcomes of students in similar circumstances.

Conversely, academies that meet local or national benchmarks may not always have outcomes that exceed other courses of study at the same school.

Thus, if career academies are held accountable to national (or local) standards without considering how students would have performed in their absence, their efficacy may be misunderstood. Academies may be undervalued if they are compared to national standards but operate in very dysfunctional schools, or if they have student populations that are not prepared for high school academic work. Initial knowledge and skill deficiencies cannot be brought up to the established norms for all students in a three-year period, especially if the environment is not conducive to learning. This is not to say that high academic standards should not be developed and maintained. Indeed, findings from this study strongly suggest that keeping such standards is a necessary condition for postsecondary success. Rather, the inference is that career academies cannot erase all of the academic problems associated with our educational and social systems, nor can they offset all of the knowledge and skill deficiencies that students bring to high school. Clearly, other changes must be implemented in conjunction with career academies (and any other school reform) if all students are to leave school prepared to face the labor market and educational challenges of the 21st century.

CHALLENGES FOR EDUCATIONAL REFORM

Findings from this study raise important issues for program planners and administrators to consider if they are to build successful career academy programs. Our results suggest that career academies have many very positive, effective strategies for educational reform. We therefore conclude that career academy programs can facilitate postsecondary success for inner city, public school students. However, two caveats are in order. First, it is critical that career academies build academic skills. Program designers should resist the temptation of a quick fix that substitutes career exposure or work experience alone for serious academic preparation, or that channels students into highly specialized job-specific training without broad grounding in basic academic skills.

Second, not all career academies are equally effective at building students' scholastic knowledge. Considerable diversity emerged among the nine programs that were ostensibly developed under the same model, differences that were understandable in terms of school-specific cultures and resources. The career academy model is multifaceted and requires a wide array of new resources and practices. It is not necessarily a bad thing for this diversity to thrive in a large school district, but it is important for administrators to understand whether a site has the necessary basic components and commitments in place to make a real impact, and if not, how to achieve them.

From these two general findings, we conclude that academy programs can be effective as educational reform only if and when they successfully increase academic knowledge and skills beyond what is gained in existing courses of study. The additional cost of the academy programs, even with economies of scale, may not otherwise warrant their implementation.

Related questions of how widely the academy strategy must be implemented, and for what proportion of the student body it should be available, need to be asked. An important aspect of the academy ideology has been support for maintaining the heterogeneity of participants, including both vocationally and academically oriented students. There is a difference, though, between achieving this kind of diversity and expecting the academy model to be the best reform effort for every student in every high school. Given these concerns with quality and appropriateness, we now turn to a number of items that our study indicates should be considered if programs that lead to true educational reform are to be designed and put into place.

Designing and Building a Successful Program

While the strongest academies in our study increased academic skills and independently motivated students toward postsecondary education, the weakest academies had no distinguishing impact on outcomes, and nonetheless absorbed additional resources. Thus, the most important challenge for planners and administrators is to ensure that all the program components are set in place. Again, that may sound basic, almost tautological, but the experience of school reform is rife with new endeavors for which the labels are widely distributed but the substance is not fully imparted. Our study showed that successful career academies had several characteristics in common. Specifically, such programs had the following achievements.

- **Offered students a relatively complete curriculum.** Each course in the core academy curriculum needs its own new curriculum, with projects that integrate material across courses and a group of teachers with the time, opportunity, and inclination to continuously work together. This will not happen overnight, but there are ways in which principals and program directors can support the staff and the curriculum development necessary to raise academic content. In the absence of that support, courses may be labeled as being part of an academy, but not be substantively changed. Both the academic learning and the motivational qualities suffer as a consequence.
- **Built a school-within-a-school that sheltered students from hostile or indifferent school environments and gave them a social support system of teachers and peers.** The students' appreciation of and loyalty to the "community" of the more effective academies are very significant and clearly contribute to the positive outcomes. Even some of the academies that consistently scored below the city's performance standards, and whose outcomes in the quantitative analysis were relatively modest, were

undeniably very influential in turning around not just the grades but the lives of many troubled students, as a result of personal attention.

- **Required large amounts of start-up resources in terms of time (staff and curriculum development) and internships.** At one point in the early 1990s, for example, five of the oldest academies were spending approximately $3,000 per student more than the district's average, an amount that has since declined to less than $1,000. In those early years the extra funds covered a great deal of teachers' extra time for curriculum development, coordination among classes, and academy administration, as well as the wages for the student internships. The academies started more recently did not have a comparable amount of paid extra time for teachers, which may be one of the reasons they have struggled to put together complete programs. Initially, the extra funding from the redevelopment agency was applied to all aspects of the program, but after a few years that agency sought to direct its contributions solely to the component most closely tied to economic development, that is, the internships. A successful academy will need enough diversity of flexibility in its resources to cover the extra faculty development costs and other "inside" activities as well as the internships and community-based components.
- **Had a program head whose commitment, energy, and devotion led and inspired other teachers as well as students.** The key question of institutional development, of course, is how can more teachers with these skills and motivations be identified, nurtured, and supported in sufficient numbers? Since the city is moving toward districtwide implementation of career academies, the issue is one of central importance. To some extent, having the model incorporated into the day-to-day fabric of schools and having the district relieved of the burden of being a "pioneer" reduce a great deal of stress. Still, the qualities of leadership and creativity are very necessary.
- **Gained school and community support.** The more effective academies had active advisory committees whose participants did most of their work outside the meetings, and who could be

counted on for personal help and organizational resources as well as for financial contributions.

As school-to-work strategies have become more pervasive, a national framework of technical assistance, capacity-building organizations, and information sources has evolved. Indeed, several of the city's administrators and teachers are frequent contributors to these efforts. At the same time, many national organizations have assisted staff and curriculum development locally. This work is no doubt valuable. At some point, though, the widespread adoption of a new approach to teaching and structuring schools can no longer be seen as a pilot, an experiment, or a demonstration. From that time on, full implementation requires that the basic systems, incentives, and organizational culture of schools and central district office incorporate the requirements of the model. This means, for example, that principals would proactively redesign their institutions around school-to-work program needs, expecting in turn that this would advance a broader academic mission. Integration would become central to overall high school curriculum development and training, not to only a small group of teachers. That turning point should occur over a period of several years.

Engaging the Appropriate Students

Career academies in our study did not equally benefit all students. While our data did not permit a detailed assessment of exactly which individuals learned most effectively in the career academy environment, our findings challenge administrators to determine the students best suited for these programs. In designing career academies, administrators may want to consider the following issues of student participation.

First, while our study showed that the academies could successfully increase knowledge and skills, whether or not they are appropriate for all groups of students may be determined by individual learning styles. A commonly held perception among school-to-work advocates is that 70 percent of students learn best when the education is in context. This means that as many as 30 percent of the students may learn better in more traditional settings. Also, for the 70 percent who do learn best in context, the labor market may not be the most compelling example for all of them. Instead, some students may benefit from a different type of integrated or contextual situation (e.g., McQuillan 1998).

Second, neither traditional vocational education programs nor the career academies appear to systematically improve labor market outcomes for students immediately after high school. As such, a curriculum void may still exist. Traditional tracking enshrined a vocational curriculum for students who wanted to pursue work directly after high school. Direct support for these individuals may be missing if the benefit of career academies lies in their ability to increase knowledge and skills and, as a result, the probability of attending postsecondary educational institutions. The response given by most school-to-work advocates is that both options should remain clearly open through the same program. Indeed, numerous school-to-work approaches in other cities are more directly connected to the workplace. Many of them, however, do not show the high rates of college attendance evident in programs such as the ones discussed in this study. The findings suggest that the challenge of serving this heterogeneous group well may be harder than it first appeared.

Engaging the Appropriate Staff Participants

We show that career academies 1) developed at schools that drew students from relatively low socioeconomic status populations, 2) developed at different rates in disparate school environments, and 3) developed at different rates within the same school. This uneven growth suggests that it is important to ensure advocacy for the program's strategy at the site prior to its implementation, and that it is necessary to continually build that backing over time. Our qualitative analysis suggests that the following constituencies are needed for successful programs to be implemented.

- **The widespread and genuine support of teachers is essential to developing and executing the curriculum necessary for the career academy.** Without teachers' backing for the innovations, courses might continue to be taught as they always have been. It is only when teachers believe that an integrated, challenging curriculum can and should be the means to achieving postsecondary achievement for students that career academy programs will be successful. In most instances, teachers are the best ambassadors for the new approach. No sheaves of analysis, case studies from afar, or administrative edicts can match the influence of peers who can candidly relate their classroom experiences to those who are asked to take on something unfamiliar and perhaps threatening. Another key to teacher confidence consists of administrative consistency and follow-through. Given the frequency with which reforms are started in high schools and the resulting weariness if not cynicism, it is important for the credibility of school-to-work programs that the promised resources and assistance be delivered in a timely manner.

- **Parents and the community must believe that career academies can facilitate the postsecondary success of their students.** Without such support, career academy programs will remain undeveloped or underdeveloped, because opposition or ambivalence will retard their growth. As we saw, career academies developed initially in schools that were believed to be most in need of reform and remained much less developed in the two schools that had the highest socioeconomic status. Unless the school community can be convinced that reform is necessary and that career academies are the appropriate vehicles, change will not occur.
- **Principals and district administrators must support career academy development.** Site administrators hold the key to scheduling teachers and classes and to providing funding and student enrollments and will do so in the manner that fits their vision of instructional leadership. District administrators determine the focus of staff development days and set content standards, curriculum practices, and educational goals, partly based on past practice and partly on the current districtwide reform strategies. Site administrators can, for example, impede implementation by not scheduling students and staff into the necessary courses, and central office administrators can hinder programs by withholding staff development dollars and time needed for career academies to reach their potential. Both site and district policies can either keep the costs of implementing career academy programs high (e.g., inhibit appropriate scheduling) or can reduce their (mar-

ginal) cost. Unless both levels of management work in concert, there will be major gaps in the support system for the program.

Administrative concerns are different on either side of the turning point between demonstration program and widespread strategy. When the academies are relatively small in number, as academies in most cities are, the program must be given enough attention and support as well as enough "breathing room" to carry out the admittedly different approach. Once the strategy is incorporated into districtwide educational reform, the challenge shifts to ensure compliance with standard practices, a smooth flow of resources to the site, and a mechanism for feedback and modification of the now large system. Many school districts around the country may need to move from one stage to the next in the coming years.

Determining the Appropriate Scale of a School's Academy Offerings

How widespread should the adoption of the career academy strategy be? The potential has prompted a number of districts to convert entire high schools to academies. The caveats to successful career academy operation that were noted in this study, and the challenges that they raised, should give pause to the idea that career academies should "go to scale" within a district or be "wall-to-wall" within a school. Our institutional analysis suggests that the following considerations should be contemplated before adopting an all-academy model.

- **Career academies are expensive undertakings when fully realized.** Subsidized work internships, for example, are very costly when provided for the majority of academy students, although the primary bearer of that expense will vary. In the schools in our study, a third party (the city's redevelopment agency) granted most of the funds for the internships. As a consequence, the future of the program was in doubt each time that grant was threatened. This was the case when only 10 to 15 percent of the high school population was enrolled in academies. The amount needed, and resulting vulnerability of the program to budget problems, would be many times greater if 70 percent of the students were enrolled and paid internships were expected for most of them.[4]

There would no doubt be efficiency gains from taking the academy model to scale across a school district,[5] but much of the staff time, equipment, program administration, and internship costs would still be needed for each unit of expansion. The long-term strategy may not be one based on economies of scale as much as on the incorporation of more academy functions within the basic core mission and budget of the school system. In that way, the costs become central to the running of the schools, not dependent upon funding for a separate "program" subject to the vicissitudes of grants and policy changes.

It is important to remember that however the costs are borne, the question of cost-effectiveness is equally relevant. If the academy does not increase educational benefits over traditional programs, even small marginal costs of program offerings would not be worth the investment.

- **Much of the success of the career academies may lie in their smallness.** Small programs can create an intimate "school-within-a-school" environment in which students can feel special and supported. It is unclear whether this same atmosphere can exist if an entire school is composed of career academies. In fact, one danger may be that this would create a hierarchy of academies within a school and possibly replicate the kinds of distinctions that result from tracking.
- **A school that contains only career academies may face fairly intractable scheduling problems.** What happens to the student who is in the Health Academy and wants to take a German elective that conflicts with the academy's English course? If part of the school's curriculum is not within an academy, the student can substitute traditional English for Health Academy English. However, if all English courses are integrated into an academy, the student must take (for example) "Engineering Academy English," which in turn is integrated with engineering math. This not only dilutes an Engineering Academy's integrated curriculum by having ill-prepared students in the classes, it also may cause confu-

sion for the Health Academy student who is unfamiliar with the engineering field. To avoid this, some schools have combined students from two academies in the same class. This loses much of the curricular focus of having the academy in the first place. There are, of course, other conundrums of scheduling that will take serious work to overcome in a program taken to this scale.

- **What happens to the teachers and students who do not want to be in academies?** If part of a school's curriculum lies outside of academies, teachers and students who are not suited to this style of instruction can be shifted to nonacademy courses. This is not an option if schools or districts contain only academy programs and also raises the possibility that significant numbers of teachers will not have the interest, focus, and commitment that the programs need to be effective, but will be assigned to them anyway.

We do not mean to suggest that these issues are unsolvable. However, they will require sustained, creative, inclusive, and systematic planning to reach the best level of implementation of school-to-work programs. That kind of focused effort is not easy to muster, but it will be necessary.

IMPLICATIONS FOR POLICY

We now return to the discussions about the broader goals of public high schools with which we opened this book. Chapter 1 raised several long-standing concerns about our educational system that school-to-work efforts were designed to address. Using results of this study as a basis, we will consider whether or not the career academy, as an exemplar of school-to-work programs, has the potential to reform some of the more prominent problems that have surfaced.

Is it, and Should it Be, a Complete Departure from Traditional Vocational Education?

Three frequently voiced critiques of school-to-work programs concern their comparison with traditional vocational education. On the one hand, after the advent of the Perkins II legislation, many progressive vocational educators felt that their field was already modernizing and increasing its academic content. This suggests that vocational education did not need to be replaced by school-to-work programs. On the other hand, critics argue that school-to-work reforms are merely warmed-over vocational education and do not represent a fundamental change in the way in which schools operate and track students. The third type of criticism, as expressed in extreme terms by Phyllis Schlafly, is that the school-to-work approach is an abandonment of real education entirely in favor of rote "training" for menial jobs. These commentators argue that school-to-work programs threaten to undermine students' rights to learn in order to satisfy federal mandates and the labor needs of large corporations.

The validity of these criticisms depends upon the practices of individual programs. Our sense is that the city in this study was fairly typical with academies containing predominantly academic teachers and a heterogeneous group of students. However, as academies proliferate in one city or district, they will inevitably incorporate the teachers and resources of the former vocational education programs. The critical issue is how the merged programs will develop.

Career academy programs strive to present a coherent curriculum, with integrated academic and vocational components (including the internship) and increased educational standards. The curriculum integration and the contextual motivation for studying should give students the ability and incentive to pursue postsecondary education. Done well, the programs in no way resemble the high school "training" so criticized for mediocrity. However, because this is such a challenging, multifaceted concept to implement, there remains the very real concern that too-rapid expansion would result in little more than the relabelling of traditional vocational education activities.

Is it the Solution for Skill Mismatches in the Labor Market?

Chapter 1 raised several concerns about the skills mismatch between labor market entrants and the available jobs in our cities, a problem that school-to-work programs are, in theory, designed to overcome. Results of this study are mixed with respect to the career academy's ability to alleviate the situation. If the broadly defined issue includes the general mismatch between the low level of skills that labor market entrants generally have and the relatively high level required by employers, convergence would occur, based on the evidence that career academy students left high school with greater levels of academic knowledge and skills than did nonacademy students, and because a greater percentage of career academy students attended postsecondary educational institutions.

If, however, the problem is narrowly defined, to encompass only the lack of fit between the job-specific skills that local employers desire (e.g., dental technology) and the skills that new entrants have, then results of this study suggest that the career academies have a limited capacity to alleviate mismatches. Little difference existed between the wage and employment of career academy and nonacademy students in the first few years after they left high school. This suggests that academy students were not moving directly into positions left unfilled by skill mismatches. If they had, the skills that career academy students brought to the labor market would have increased their wages and employment opportunities over that of nonacademy students. Thus, career academies may not alleviate narrowly defined mismatches, especially for young workers. We recognize that this city's program was less directly geared than some toward building a pipeline to employment. It was, however, a rational response to the circumstances in the local labor market, and many other school-to-work programs are very similar in this respect.

Is it the Solution for the Comparative Mediocrity of U.S. Academics in the International Arena?

The relatively low standing of U.S. students in international comparisons of academic knowledge and skills is one of the fundamental concerns underlying educational reform. Results of this study indicate that the career academy has the potential for a positive impact along these lines. Perhaps the most robust finding is that the relatively well-developed career academies increased the academic knowledge and skills of their students over other programs. As long as expansion of the career academy approach ensures that the components for building knowledge and skills are always present, our research provides strong support for the program's ability to raise the ranking of U.S. students in global comparisons.

FUTURE RESEARCH

The implications and limitations of our study raise several questions and provide directions for future investigation. At the broadest level, inquiries must focus on the ability of other school-to-work programs to provide successful educational change. While we have shown the capacity of one school-to-work reform—the career academy—to enhance high school education, future endeavors should determine if alternative approaches have the same potential.

Our study has brought out a number of concerns about the career academy's ability to facilitate postsecondary success under all conditions, such that future research needs to find the specific elements that develop academic knowledge and skills. It is only by identifying these particular components that cost-effective career academy programs can be designed and implemented. Different types of data collection and analysis could complement and build upon our analysis by exploring the impacts of internships, integrated curricula, block scheduling, social support, training and help for teachers, and other program elements. Both econometric analysis of program inputs and outcomes and qualitative analysis of students' and teachers' experiences are necessary. Institutional analysis must uncover school, community, and political environments that facilitate or inhibit development and implementation of effective career academy programs. In our district, the academy's success depended on a complex, sometimes fragile, mixture of heroic personal efforts and organizational supports. By identifying key environmental factors, thriving programs can be planned, fostered, and operated.

Issues that have been highlighted by the idiosyncrasies and special circumstances of our case study should be reexamined through future research. The points of comparison should not only be other large central cities. For example, do career academy programs work equally well in suburban and rural communities? In small, relatively isolated urban areas? In private schools? Do career academies increase knowledge and skills in environments with high widespread expectations for scholastic achievement?

Another set of questions awaits the passage of time so that longer-term outcomes can be assessed definitively. Do career academies increase employment and wages of participants once youth establish more stable work trajectories? Do academies support postsecondary degree completion as well as attendance? How do career academy students fare with respect to remediation, retention, and time-to-degree in postsecondary education? Is there any long-term effect of academy students going into the specific career fields they studied in high school, or even of returning to the firms in which they interned? For authorative answers, most of these issues call for a time period of 6 to 10 years after high school.

At a more global level, the development of career academies in schools with students from the lowest socioeconomic service areas suggests that such programs may be growing in institutions that traditionally have had poor academic performance. If this pattern is extrapolated across districts, it suggests that career academies will be in schools and for students that have traditionally been left behind in our educational system and in the labor market. This pattern might perpetuate the problems associated with traditional curriculum tracking and labor market screening. For example, with uneven career academy distribution across the socioeconomic spectrum, students from academies might be stigmatized as being from lower socioeconomic environments, where underachievement is believed to be the norm. This could thwart students' postsecondary efforts. Employers' and parents' perception of students from career academies may well depend on a demonstrated record of educational success. That would, in time, build support to establish more programs in higher socioeconomic areas and to break the stereotypes associated with traditional tracking. In many respects, regardless of the immediate outcomes of school-to-work programs, it will only be when students from lower socioeconomic environments can consistently succeed in postsecondary endeavors that truly equitable educational reform will have been achieved.

Notes

1. The nine academies in our analysis were those established by the time our cohorts were sophomores.
2. Of course, retention rates in postsecondary education for students from districts like ours are low even for students from career academies (Maxwell 2000). As a result, we cannot argue that increased postsecondary attendance will translate into degree completion.
3. This does not mean that academies have students with high levels of academic achievement at program entrance. The vast majority of students in the city career academies would be considered at educational risk under a wide variety of definitions.
4. We did not separately assess the marginal value of internships on the academy students. While our surveys of students and employers generally indicate that the internships were successful, it is an open question whether most employers would value them highly enough to pay the wages.
5. Economies of scale could result from, for example, the fact that, once career themes are repeated within a district, the process of developing an integrated curriculum will be shorter, and thus less expensive. The second, third, or fourth health academies may use many of the lesson plans, integrated projects, and community contacts that were developed at the original health academy, or at least adapt them rather than starting from scratch.
6. Schlafly writes, "To train means to cause a person or animal to be efficient in the performance of tasks by responding to discipline, instruction, and repeated practice. That's what you do to your dog, and that's exactly what school-to-work is: 'performance-based' training of students to move into predetermined jobs." In addition, vocational courses in high schools for illiterate or semiliterate students will train young Americans to compete in the global economy with people in the third world willing to work for 25 and 50 cents an hour. That's why a lot of big businesses support school-to-work and have entered into partnerships with governors and school districts to promote school-to-work." Syndicated newspaper column, September 11, 1998.

Epilogue: The Career Academies in 1999

The career academy program has expanded considerably since the last of the students in our sample left high school in 1995. During the mid 1990s the number of career academies grew slowly, with 13 career academies operating in the 1996–1997 school year. However, in 1996, the school board approved a districtwide school-to-work plan, "CommunityWorks: A School-to-Career System," to "educate all students to help them meet or raise their aspirations, enable them to choose from the widest range of personal and career choices and to prepare them to be effective, contributing citizens to society." Processes were developed to ensure "that each student has an individual career development plan to guide his/her academic, social and occupational development."

Under this initiative, the six comprehensive high schools were to be reorganized into career paths, following much of the existing career academy model. The academies were the primary mechanisms adopted in the high schools for achieving the goals and objectives in CommunityWorks. In fact, the district's "Vision for the Future" explicitly stated that 9th grade students were to 1) be randomly assigned to career-based houses within schools, 2) engage in career exploration, and 3) select a career academy based on individual interests. In the 10th grade, students would enter the selected academy. In theory, any student who wants to enter an academy should be able to do so. According to the school-to-work program director (August 26, 1998), this does not mean that every student will be in an academy, but that each school will offer many academy options, in as many as eight different career areas, and that most students will eventually be enrolled.

Career academy programs grew rapidly once the CommunityWorks vision was adopted by the school board, as Table E.1 shows. The number of career academies more than doubled (from 13 to 27) between the 1996–1997 and 1997–1998 school years. Six additional academies were added the following year. By spring 1999, there were 33 academies in operation, and two of the six comprehensive high

Table E.1 Growth of Career Academies

School year	Number of academies
1995–1996	12
1996–1997	13
1997–1998	27
1998–1999	33
1999–2000	33

schools had wall-to-wall academies.[1] Other initiatives in place included computerized career exploration laboratories in each high school, service-learning opportunities, mentoring, youth apprenticeships, school-based enterprises, schoolwide restructuring strategies (i.e., dividing a school into career houses), and the continuation of regional occupational programs.

Interestingly, in 1998, the year following the largest expansion in the number of academies, the city terminated its funding to the program.[2] By this point in the funding history, most of the city's monies were earmarked for internships. Concern was thus raised among many academy directors, particularly of the older or more established programs over the elimination of key funding to subsidize internships. Because directors often see internships as the "carrot" to motivate students, they worry that one primary incentive for achieving academic excellence will disappear. Only time will tell if these fears are founded.

During spring 1999, we visited 18 academies, including some at each school, to document the successes and impediments that accompanied the expansion of the program. We interviewed 18 of the 33 academy directors, including all directors of academies in this study, and 5 of the 6 principals. Our goal was to discover the program's educational, administrative, and resource needs; the status of school-based and work-based curriculum development; and plans for program operations in an environment of rapid expansion. We believe that the principals' and academy directors' impressions provide fascinating insights into the development and implementation of the academies.

As part of these visits, academy directors were asked to evaluate the importance and the level of incorporation into their program of a series of components that the city and district had explicitly agreed to foster over the years. Directors rated each element on a scale from one to five with respect to its level of importance and its incorporation into their academy. Table E.2 shows the percentage of "high" ratings given by academy directors, meaning the percentage of directors who said that the component had a "high" level of importance (Part A) or a "high" level of incorporation into their program (Part B). These responses provide a wonderful snapshot of the academy program approximately four years after our students left high school.

Arguably, each of the 17 components listed in this table is significant from the district's point of view. After all, district administrators proposed them and had contracted with the city each year since 1990 to develop every one. In general, our survey suggests that academy directors agree with this assessment. A majority of directors believe that all of these elements are important.[3] This suggests that the directors feel that these are key factors for success. Because our study suggests that more complete programs build knowledge and skills in students, these components may be necessary ingredients for building effective academies. We note that district support was rated as important by 94 percent of the academy directors, and 87 percent believed that the business community was important. This suggests that both the district and businesses are essential complements to classroom components.

Unfortunately, few academy directors believe that the district and businesses were integrated into their curricula. Although two-thirds of the directors indicated that they kept a small group of students taking classes together, for only 10 out of the 17 program components did a majority of academy directors feel that the factors were incorporated into their program. These results varied little by age of the academy. Work-based learning components were the least integrated. Only about 20 percent of academies had school-based enterprises as part of their program, and between 30 and 40 percent had integrated business community support, mentoring, and job shadowing components. Only about half had integrated internships. Joint faculty work also is lacking, with team teaching in only about one-fourth of the programs and a small group of faculty working together in 57 percent of the programs. Perhaps most striking, only about one-third of the academy directors

Table E.2 How Important and How Well Incorporated are Academy Components?[a]

A: Directors reporting a high level of importance	(%)	B: Directors reporting a high level of incorporation in their program	(%)
Small group of faculty working together	94.1	Small group of students taking classes together	70.6
District support	94.1	Build skills necessary for articulation into a community college program	64.7
Build academic skills for college attendance	94.1	Build academic skills for college attendance	64.7
Career exploration	93.7	Contextual teaching within a career focus	64.3
Integrated academic and vocational curriculum	93.3	Build work skills for labor market entry	62.4
Build skills necessary for articulation into a community college program	88.2	Career exploration	62.4
Small group of students taking classes together	88.2	Integrated academic and vocational curriculum	60.0
Integrated internship	87.5	Field trips	58.8
Business community support	87.5	Small group of faculty working together	57.0
Build work skills for labor market entry	87.4	Integrated internship	51.0
Articulation agreements with higher education	86.6	Job shadowing	40.0
Contextual teaching within a career focus	85.7	Articulation agreements with higher education	40.0
Field trips	82.3	Mentoring at the work site	37.5
Mentoring at the work site	75.0	Business community support	37.5
Job shadowing	73.3	District support	35.3
Team teaching	66.7	Team teaching	26.7
School-based enterprises	64.3	School-based enterprises	21.4

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[a] In Spring 1999, the 18 directors of academies that were funded by the city in the 1997–1998 school year were interviewed. In 1997–1998, 27 academies were in operation, 14 of which were in the first year of operation. The program expanded to 33 academies during 1998–1999 and remained stable during 1999–2000. Academy directors were asked to rate the following components on a scal of 1 to 5 with respect to both the level of importance and incorporation into the specific academy. "Low" is defined to be a 1–3 rating, and "high" is defined to be 4 or 5. Each of these components is included in the contract between the city and district as elements to be evaluated for the management of the program. Numbers represent the percentage of directors who responded "high."

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felt they had district support. Given the high level of commitment of this district to the career academy model, the lack of assistance at the site implies that effective institutions do not yet exist for the program's development.

These results suggest that the academy model that the district developed was still not in place eight years after the city increased the program's monies by about $800,000 a year and three years after the school board put the program at the heart of its reform of high schools. Still, despite the lack of development and implementation of the conceptual model, these actual career academies can be viewed as a success along a number of lines. Principals and academy directors tell of these achievements. Their eloquence conveys the many positives that the academies produced, in spite of the barrage of impediments that were placed in their way. The words and views that academy directors and principals expressed speak volumes about implementing a conceptual model in an all too real world; the following sections contain quotations from academy directors.

THE GOOD

On a sense of community . . .

> The academy is a different way of dealing with things, connections with the students with a particular teacher as a home base, then they [the students] buy into the program, the school, themselves. The academy answers the question for the students of 'Is there a safe place for me?'
>
> The academy students and teachers are like a family that helps each other get through the rough times. You often find yourself as their [the students'] advocate. You are the only voice that they have. Academies are like families.
>
> The small groups work well with the students, this gives them the opportunity to get more personal attention and intervention is more visible with the smaller community groups.

On internships . . .

> The internships are the best focus the kids can get as exposure to the industry and the real world. The hands-on experiential learning is really an essential part of the program. I think it is one of the most exciting things the kids can be involved in because that is really going to put some meaning in what they are learning.
>
> If the internships disappear, an important part of the reason students are in an academy will also disappear.
>
> We are dismayed about the [loss of the] internship program. That was one of the best levelers of all youngsters. When the youngsters are paid for work they have instant gratification and self-esteem. I don't care what it is; you can give them all the certificates in the world, 'show me you love me by the money'.

On the district's summer training and planning program . . .

> CommunityWorks workshops allowed us to put the curriculum in place during the summer. During that time we met with the other computer academies to agree on some basic standard, basic things that should be covered in every computer academy district-wide. This is an on-going thing; within our school we have to strike a balance between different departments and the academy. We meet and talk about it on an informal basis, because we have no common time to work on it together.

THE PROBLEMS

On paperwork and the district . . .

> The communication between the . . . [district] office and the school sites could be improved to refocus on the students. There is a breakdown between the two. You see the . . . office deals with paper and the schools deal with real issues. So there is a thick wall of bureaucratic red tape and we are all working for the same goal.

Many academy directors indicated that their relationship with district personnel office was an unfriendly one. For example:

> I detest them. I am sick of them.
>
> [My] being at the district office to turn in the required paper work is an imposition on them [district office personnel]. They acted irritated that they had to interrupt their work to take care of me.
>
> I get 'bad vibes'.

On teacher selection . . .

> Some teachers don't pull their own weight. The district hiring process is such that academies have no input as to who is hired for what academy. Some teachers are willing to put in the time to develop integrated curriculum and some are not.
>
> The academies were started with all volunteer teachers who joined because of high academic goals. Now teachers may be hired with the academy as part of the job description. Other teachers are just placed in the program This precludes a "buy-in" by those teachers. Buy-in is vital for commitment to the program and to the academy teacher group. Facilitating integration of business into the curriculum writing takes a group effort and common prep time. A teacher who has not 'bought-in' to the academy model will not make this extra effort.
>
> We are not able to select new teachers. There is no communication to us who is going to be there next year. Teachers are just put in. Turnover is a problem. And they don't get any training. It is up to the academy director to get them up to speed. The Summer Institute should be mandatory but it isn't and the compensation is just too little.

On coordination . . .

> Staffing is becoming a growing problem. The academy directors solicit the teachers, and there are very few volunteers. In many situations a teacher may be involved in three different academies and therefore it waters down their entire curriculum. As far as scheduling is concerned, only the one academy has a common prep period and it works just fine. However, the other academies do not have common prep periods. It would really be nice to allow the other academies a common prep period so that they can plan and discuss academy business. The directors, co-directors and teachers do meet with the School-to-Career liaison once a

month, but that really doesn't seem to help because she doesn't do much work for the academies. The School-to-Career liaison is very disorganized and does little to help coordinate the academies.

Now since so many teachers are in more than one academy, some teachers who chose to be in one must go to another academy's meetings. They want a school-within-school, however, with different teachers in two different academies they are just overextended.

On teacher turnover . . .

We basically have developed the curriculum we need. We did that several years ago together. The problem is the implementation. We spend all this time working with people in developing a curriculum and then they change the staff around.

On scheduling . . .

With eight academies it has been difficult to maintain an academic college prep course. It is a scheduling nightmare. We have scheduled our AP [Advanced Placement] courses early in the morning at 7:15 a.m. We currently have five AP courses. Staffing becomes a problem when the academies have a teacher that they do not want. This one teacher could have been placed into the academy but the academy doesn't want that teacher. Currently there are some teachers in two academies but next year our high school will arrange it where there is only one teacher per academy.

Some of the challenges we face are scheduling these activities [work-based and school-based learning] accordingly. The directors and teachers work with the School-to-Career liaison to coordinate and schedule the activities, but many times it can be so overwhelming for everyone involved. Transportation issues can also pose concerns, being that the buses do not run throughout the day. However, I do believe that these activities enhance the school and [it] is an advantage to the students to get a reality-based exposure to the real world.

When we became wall-to-wall it was a scheduling problem more than anything. Just getting the kids scheduled in the right classes and making sure they were on the right track. It helped a lot that

> we have a School-to-Career liaison on campus. The scheduling was the main problem, but it is slowly getting better and easier.

On time as a scarce resource . . .

> I don't have a life anymore. This [academy director] is a 7 day a week job, before, during and after school. We have an extended contract for 1 hour a day, but really you do 10 times as much.
>
> It is just too much to have to teach and do the documentation, the phone calls, the tutoring sessions. I work on this more than 20+ hours a week, but they only pay us for 18 hours a month. You can't just do this job just for the money.
>
> The single prep period common release time for teachers is still needed but has been eliminated. Extra release time is also needed for directors. Parent contacts and effective common meeting time with teachers require about 1 period a day for directors. Action plans, report to districts, and various paperwork take up another 2 periods. As the program stands now, this time must be put in after school hours. The directors end up with their focus split between administering the program and teaching. The students lose out.

On the loss of city funding . . .

> What really concerns me is the loss of the internships that take a long time to build. It takes years to work out the kinks and we are just at that point now. So if we are to lose that funding then we are really going to be at a tremendous loss. They are not going to have that exposure they are going to have otherwise unless they have mommies and daddies that have those connections. They are going back at those McDonald's jobs and they are never really going to be able to think of themselves like—'Hey, I could do this. I could fit in this world.' . . . If we don't continue to offer them those opportunities to do that, we are going to fail them. I am very concerned about that.
>
> Without city funding, "I don't know what will happen. There is no replacement for this funding. The industry won't come up to this scale of support. How can I ask the businesses to pay for internships in a town with so much unemployment? Everyone will use free labor—it is good for the company, good for the student and so far there haven't been any problems with the unions.

But the companies can't afford to pay. What are they going to do—hire the student and fire the parents?

EXPANSION

The good . . .

This expansion is the best thing that could happen to any urban school district or suburban for that matter. For kids that don't have rich mommies and daddies the academies are the best reform out there.

If applied successfully the academy model can work. It meets the needs of students that the traditional strategies can't. It has all kinds of benefits. It is a program that monitors progress more holistically. It's got everything in it. If you see anything missing it is easily added. Kids will get to know an awful lot.

It has been good, there's no doubt. Student achievement–wise. Students have a sense of belonging to a group. It is also of benefit in choosing a career.

The application of the academy model to scale makes a lot of sense in a system that is crazy and in which kids get lost.

Academies have their up years and down years. I'm not sure I'd do it again because I'm not sure the academies are the solution. The academies are a good idea; they may be better than the old way, but I'm not sure they are really working.

And the bad . . .

The expansion of the academies has created a competition to get enough bodies to fill each academy. And often the academies compete on grounds that are not educationally sound, like the charisma of the director and fieldtrips, that kind of thing.

Since the School-to-Career department is so large, the academies are now stifled in a bureaucracy. I would say don't do it. Don't expand until you have it working.

I will not allow any more academies at our high school. I would rather see the quality increase of the existing academies rather than quantity increase. It takes time to get the academy to become successful, and that is only if the teachers and directors are willing to put out that extra time to make it work, and if the school went wall-to-wall academies, it would just be too much for everyone. (From a principal)

AND TO MAKE THEM SUCCESSFUL . . .

At our school it [the career academy] has made a positive impact on the outcomes. This one academy is such a dynamic group that is shines in every way. This is attributed to the hard work and dedication of the directors, teachers and students. If all the academies could come out like this one, it would truly make a great impact on educational outcomes.

Which means . . .

A successful academy director must have bought into the concept of academies. This director must have the passion to support the students into becoming successful. They must also have the skills to work with a diverse population and contribute to getting it across school-wide. They must also have the passion to make the schedules work. They must also have the ability to motivate others to make it work.

A successful director needs to be organized, knowledgeable of the structure, and have the ability to take risks with supporting these kids and seeking other resources, either financial or non-financial. The director should be able to spend that extra time with the kids either before or after school and want to spend that extra time with the kids. The director should be a bit of an entrepreneur and show the kids what a business plan is and how it works and be enthusiastic about the whole deal. The enthusiasm must be high and the director needs to be able to identify when the student shows signs of needing some intervention to keep them on track.

Our academy is successful largely due to teacher effort. Some teachers even do the extra work required by the academy model without buy-in, because they care about students.

> You can really see why their academy is such a success, because of all the hard work the directors and teachers put into it. This academy has a solid core of teachers. They have worked hard these last seven years and it shows through the academy's students and its success.

And those, it seems to us, are appropriate last words for now.

Notes

1. No new academies opened during the 1999–2000 school year.
2. The city ended funding because of budget shortages in the central district's redevelopment fund, not because of negative assessments of the value of the academy.
3. In only two program components, school-based enterprises and team teaching, did as many as one-third of the academy directors believe that a component was of low importance.

Appendix I

A Description of National Databases: High School and Beyond, and the National Educational Longitudinal Survey

Two different national databases are used for the background analyses presented in Chapter 1: High School and Beyond (HSB) and the National Education Longitudinal Survey (NELS). The cohort of students in the NELS left high school at about the same time as the students in our local case study, while the cohort of students in HSB left high school approximately a decade earlier. Because individuals in the national databases were in high school programs largely composed of traditional curriculum tracks, they provide contemporary (NELS) and historic (HSB) points of comparison with the career academies in our study.

NELS followed a cohort of individuals who were eighth graders in spring 1988, the class of 1992, while HSB followed a cohort of individuals who were sophomores in spring 1980, the class of 1982.[1] We restricted our analysis of both databases along two lines in order to parallel that of our case study: first, using only individuals who began and left the same high school (comparable to staying within one district), and second, using only students at comprehensive urban public high schools (for better comparison to our case study school district).

Because the NELS cohort is approximately the same age as our local sample, statistics from this database provide analogies between educational outcomes of the career academy in our case study and of the more traditional high school programs during about the same time period. Most sophomores in the HSB surveys left high school in the early 1980s, left postsecondary education in the late 1980s and began their "postschool floundering" labor market experiences before 1990. Thus, HSB examines postsecondary outcomes for students who spent high school in largely traditional curriculum tracks and traces through the impact of high school as it was experienced prior to the widespread implementation of school-to-work reforms. Also, because HSB collected data on respondents 10 years after an "on-time" graduation, this database affords the opportunity to examine the labor market outcomes associated with different high school programs.

NELS: 1988–1994

Although the NELS database provides longitudinal information on a base-year sample of 8th graders in 1987–1988,[2] we use only the first follow-up to this NELS sample, conducted when most of the base-year sample was in 10th grade. The first follow-up NELS survey sample included base-year respondents and a freshened sample that was added to achieve a sample representative of the nation's sophomores in 1990. This round of surveys included some 18,000 students, over 1,000 dropouts, nearly 1,300 school administrators, and about 10,000 teachers. In this wave, students completed a series of cognitive tests and a questionnaire that covered school experiences, activities, attitudes, plans, background characteristics, and language proficiency. The school administrator completed a questionnaire about the school, and two of the student's teachers answered questions about the student, themselves, and the school.

The second follow-up to NELS began in early 1992, when most of the aforementioned sophomores were second-term seniors. To meet budgetary constraints in this year, approximately 21,000 base-year students were sampled, with the subsampling carried out in proportion to the number of base-year students sampled within a school. This greatly reduced the number of schools involved.[3] As in the prior waves, multiple respondent populations were surveyed: students (including dropouts), their teachers, their parents, and their school administrators. Additionally, a school records component (i.e., transcripts) was included in the design.

The third NELS follow-up began on September 30, 1994, approximately two years after most individuals left high school. The CATI-administered[4] personal interview collected information from about 16,000 individuals on their academic achievement, perceptions and feelings about their schooling and job, detailed work experience, work-related training, family structure, and family environment. The questions were designed to sustain trend comparisons with HSB.

Estimations using NELS data are identical to those presented in Chapter 2. Of course, minor data inconsistencies dictate using different control variables. While measures were selected to be as comparable as possible between NELS and our City Student Database (CSDB), one notable exception exists. When high school grade point average (GPA) is used to measure knowledge and skills taken from school in CSDB estimations, the composite test score in 12th grade is used in NELS and HSB. This test was given as a part of the survey during the senior year (for students still in high school) or two years after the sophomore year (for students no longer in high school).

HSB: 1980–1992

HSB data collection began in the spring of 1980 with a highly stratified national probability sample of 1,110 secondary schools. Thirty-six sophomores were selected for interview at each school.[5] The final sample consisted of over 30,000 sophomores at 1,015 public and private high schools. During the base year (1980), five survey instruments were implemented: a student questionnaire, a series of cognitive tests, a school questionnaire, a teacher-comment checklist, and a parent questionnaire. The student questionnaire focused on individual and family background, high school experiences, work experiences, and plans for the future. The cognitive tests measured verbal and quantitative abilities, including achievement in science, writing, and civics. School questionnaires, which were filled out by an official in the participating institution, provided information about enrollment, staff, educational programs, facilities and services, dropout rates, and special programs for handicapped and disadvantaged students. The teacher-comment checklist provided instructor observations on students participating in the survey. The parent questionnaire elicited information about the effects of family attitudes and financial planning on postsecondary educational goals.

The first follow-up in 1982 consisted of (attempted) interviews with all individuals who were included in the base year. Individuals who were no longer enrolled in their base-year school (e.g., early graduates, dropouts, and transfers) were subsampled for inclusion. Most individuals were second-semester seniors during this follow-up. Data collection from the students included information on school, family, work experiences, educational and occupational aspirations, personal values, and test scores. A first follow-up school questionnaire was requested from all schools selected in the base year, and schools that had en masse transfers from the base-year sample were contacted to complete a first follow-up school questionnaire. Subsequent to the first follow-up survey, high school transcripts were sought for a probability subsample of nearly 18,500 individuals. The transcript sampling design increased the overrepresentation of racial and ethnic minorities, students who attended private high schools, school dropouts, transfers, early graduates, and students whose parent participated in the base-year survey.

The second follow-up to HSB was conducted during the spring and summer of 1984 and included a probability sampling of about 15,000 individuals from the transcript sample. This time frame corresponds to approximately two years after an on-time graduation. Data were collected on work experience, postsecondary schooling, earnings, periods of employment, and family formation. The fourth follow-up was undertaken in 1992, approximately 10 years after individuals left high school.[6] This follow-up contacted the 15,000 members of the second and third follow-ups (with the exception of the 56 deceased respondents). The CATI-designed data collection focused on access to and choice of undergraduate and graduate institutions, persistence in progress through the curriculum, rates of degree attainment, and rates of return on education to both the individual and to society. During 1993, another post-secondary transcript study was conducted to gather data on the students' academic activities about 10 years after leaving high school.

HSB, like NELS, is used to estimate models of knowledge and skills acquired in high school and education and labor market outcomes about two years after leaving high school. HSB is also used to examine the impact of the high school program on educational attainment and earnings about 10 years after leaving high school. Using this longer time frame, we describe the impact of the high school program on ultimate educational attainment and labor market outcomes by extending the production function so that

Eq. AI.1 $\text{Degree} = \alpha_0 + \alpha_1\text{Hsprog}_j + \alpha_2\text{Demo}_k + \alpha_3\text{Hsskills}$

where

Degree = a vector of variables designating a series of degrees achieved approximately 10 years after leaving high school,
α = the estimated coefficient,
Hsprog = a vector of binary variables indicating the respondent's high school program,
Demo = a vector of variables designating race, ethnicity, and gender, and
Hsskills = academic achievement test score in 12th grade.

We also examine the impact of the high school program on earnings by extending the typical log wage estimation to include the high school program:

Eq. AI.2 $\text{Earn}_{10} = \beta_0 + \beta_1\text{Hsprog} + \beta_2\text{Demo} + \beta_3\text{Degree} + \beta_4\text{HC}$

where

Earn_{10} = the respondent's (log) annual earnings approximately 10 years after leaving high school,
β = the estimated coefficient, and
HC = a vector of variables measuring labor market human capital accrued approximately 10 years after leaving high school.

Our dependent variable in Eq. AI.1 is whether the respondent received a high school diploma, associate's degree or certificate, or a baccalaureate degree or higher, as our measure of degree achievement. Our dependent variable in equation Eq. AI.2 is log earnings. We would like to separate labor supply from wages in estimating equation Eq. AI.2; however, HSB has only a measure of annual earnings without concurrent measures of hours worked. Our empirical measure of "wages" is therefore the log of annual earnings and captures both employment and wages. As a result, our estimation encompasses employment gains, and not wage gains, that are associated with the high school program.

Because postsecondary degrees are measured with binary dependent variables, we estimate a series of probit analyses for each educational progression (e.g., high school degree, associate's degree or certificate, baccalaureate degree or higher). We use ordinary least squares (OLS) to assess the impact of high school program on (log) annual earnings. As discussed in Chapter 2, significant, positive coefficients on the high school program ($\alpha_1, \beta_1 > 0$) suggest that the high school program directly increases education or wages about 10 years after leaving high school. The high school program can indirectly increase wages by raising postsecondary education ($\alpha_1 > 0$), as long as education increases wages ($\beta_3 > 0$).

Notes

1. See National Center for Education Statistics (1995, 1996) for a description of the data sets.
2. We use this wave of data only to fill in background information on students (if necessary). During the spring of 1988, this base-year survey was conducted on a clustered, stratified national probability sample of 1,052 public and private 8th grade schools. Nearly 25,000 students across the United States participated. The same components as in the first follow-up were administered during this wave, with the addition of a survey given to 1 percent of the students regarding family characteristics and the student's activities.
3. Although a freshened sample was once again included in the second follow-up to achieve a representative sample of the nation's seniors, these individuals are not included in our study because they were not interviewed in 1990 as sophomores.
4. CATI = computer-assisted telephone interviewing.
5. Thirty-six seniors at each school were also interviewed; however, this cohort is not included in our analysis. All sophomores were interviewed in schools that had fewer than 36 students. Certain types of high schools were oversampled to make the database more policy relevent. These included public schools with high percentages of Hispanic students, Catholic schools with high percentages of minority

students, alternative public schools, and private schools with high-achieving students.

6. A third follow-up was conducted during 1987, approximately five years after most individuals left high school. Data from this survey were not used in our analysis.

Appendix II
Post–High School Surveys

[The entire survey of Career Academy Students is provided. Only the first page of the surveys of High School Students and of HS6 students are presented here, because the remaining pages of these surveys were identical to the Career Academy Students survey.]

Survey of Career ACADEMY Students

Name: ______________________________

Your Current Address: ______________________________

High School that you Attended: ______________________________

PLEASE READ EACH QUESTION AND SECTION DIRECTIONS CAREFULLY. There may be several sections that you need not answer. In general, you will be asked to circle the appropriate response. For example:

What is the color of your eyes?

- Brown
- Blue
- Green
- Another Color

If your eyes are brown, you would circle the dot to the left of "brown".

When the question asks you to circle more than one response, you should mark all answers that apply. For example:

Last week, did you do any of the following (circle all that apply):

- see a play
- go to a movie
- watch TV
- attend a sporting event

If you went to a movie and watched TV last week you would circle both answers.

This questionnaire is not a test. We hope that you will answer every question, but you may skip any question that you do not wish to answer.

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We would first like to ask you some general questions about your high school education.

From which academy did you receive your high school education?

- International Trade and Transportation
- Computer Technology
- Media and Communication
- Performing Arts
- Architectural Design and Construction
- Business and International Finance
- Law and Government
- Future Teachers
- Visual Arts
- Pre Engineering
- Health and Bioscience

How did you get into this academy program? (Circle all that apply)

- I was assigned
- I chose it after talking to my counselor or teacher
- I chose it after talking to my parents
- I chose it after talking to my friends
- I chose it myself--did not consult anyone
- I chose it after career day
- This was the only program at my school

Do you think you would have dropped out of high school without the academy's program?

- I definitely would have dropped out
- I might have dropped out
- I would have stayed in school anyway
- I don't Know

Did you have a mentor assigned to you through the academy? • Yes • No

If yes, how valuable was this experience? • Very valuable • Somewhat valuable • Not valuable

With regard to your high school education, please indicate which of the following applies to you.

- Graduated from high school
- Left high school but returned to earn a regular diploma or an equivalent certificate (such as GED)
- Left high school but currently working toward a regular high school diploma or an equivalent certificate (such as GED)
- Did not graduate or earn an equivalent certificate

Overall, how valuable was your high school education in preparing you for life after high school?

• Very valuable • Somewhat valuable • Not valuable

The next few questions ask about your work experiences during high school.

Did you participate in an academy paid internship? • Yes • No

If yes, how valuable was your internship experience? • Very valuable • Somewhat valuable • Not valuable

***Not counting your academy internship,* did you work for pay during high school?** • Yes • No

If you did work during high school, in addition to any academy internship, please answer the following questions.

Did you work (circle all that apply): • During any of the summers? • During any of the school years?

Was any of your employment in high school arranged by a high school teacher or school staff? (Do not count your academy internship)

• Yes • No • Don't Know

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Please check the box that indicates how well your high school education helped you to:

	A Great Deal	Somewhat	A Little	Not at All
meet work deadlines				
communicate with others				
be punctual / on-time				
be self-motivated				
think critically				
improve in basic skills (reading, writing, math)				
obtain good study habits				
maintain a positive attitude towards education/training				
prepare for your current education/training				
become aware of what is required for success				
gain confidence about your abilities				
understand the link between school and the "real world"				
set future goals				

Please check the box to indicate how you feel about your high school and your community.

	Strongly Agree	Agree	Disagree	Strongly Disagree
My teachers in high school were interested in me.				
People at my high school were friendly to me.				
I could really be myself at my high school.				
Other students at my high school liked me the way I was.				
There are opportunities for me to get ahead in my community.				
I feel like a part of my community.				
I am treated with respect in the community where I live.				
If I could move I would.				

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If you graduated with a high school diploma, please answer the questions in box A. If you did not graduate from high school, please answer the questions in box B. **Please answer only one set of questions.**

BOX A: *This section is for individuals with a high school diploma or equivalent.*

When did you earn the high school diploma or equivalent? ______________________(Month and Year)

Have you ever attended a college or university, where you took courses *for credit*?

- Yes ________(number of colleges or universities)
- No (**SKIP TO THE NEXT PAGE**)

Are you currently enrolled in a college or university? • Yes • No

If no, when did you last attend a college or university? ______________________(Month and Year)

Please answer each of the following questions about for your current or last college or university.

Major field of study (for example: Business) ______________________

Was/Is this field of study related to the focus of your high school program? • Yes • No

Was/Is the school:

- a community college campus
- a State University campus
- other ______________________
- a University campus
- a private four-year college or university

What degree or certificate were you seeking?

- none
- bachelor's degree
- associate's degree
- post bachelor's degree (a Master's degree or higher)
- certificate or license

Did you receive this degree? • yes • no

Did you hold a job while enrolled? • yes • no

BOX B: *This section is for individuals who did not graduate from high school.*

Here are some reasons other people have given for leaving school. Which of these would you say applied to you? Circle all that apply.

- I got a job
- I didn't like school
- I couldn't get along with my teachers
- I couldn't get along with other students
- I wanted to have a family or get married
- I became the father/mother of a baby (or got pregnant)
- I had to support or care for my family
- Other (describe)______________________
- My friends had dropped out of school
- I did not feel safe at school
- I felt I didn't belong at school
- I couldn't keep up with my schoolwork
- I was suspended or expelled from school
- I had a drug or alcohol problem
- I wanted to travel

On the whole, do you feel that leaving school was a good decision for you? • Yes • No • Don't Know

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We would now like to ask you a few questions about your plans and expectations about the future.

As things stand now, how far in school do you think you will get?

- Some High School
- High School Graduate
- Some College
- Two-Year College Degree
- College Graduate
- Post Baccalaureate Degree (e.g., a Master's Degree)
- Don't Know

Think about how you see your future. What are the chances that..... (Check the appropriate box)

	Very Low	Low	About 50-50	High	Very High
You will have a job that pays well?					
You will be able to own your own home?					
You will have a job that you enjoy doing?					
You will have a happy family life?					
You will be respected in your community?					
You will have good friends you can count on?					

Which of the categories comes closest to describing the career or occupation that you *expect or plan to have when you are 30 years old*? Even if you are not sure, please circle your ONE best guess.

- **LABORER** such as construction worker, car washer, garbage collector, farm worker
- **MANAGER** such as sales manager, office manager, school administrator, retail buyer, restaurant manager, government administrator
- **MILITARY** such as career officer or enlisted person in the Armed Forces
- **OFFICE WORKER** such as data entry clerk, bank teller, bookkeeper, secretary, word processor, ticket agent
- **OPERATOR** of machines or tools, such as meat cutter, assembler, welder, taxicab/bus/truck driver
- **OWNER** of a small business or restaurant, contractor
- **PROFESSIONAL** such as accountant, registered nurse, engineer, college teacher, social worker, doctor, artist, politician, *but not school teacher*
- **PROTECTIVE SERVICE** such as police officer, firefighter, detective, sheriff, security guard
- **SALES** such as sales representative, advertising or insurance agent, real estate broker
- **SCHOOL TEACHER** such as elementary, junior high, or high school *but not college*
- **SERVICE WORKER** such as hair stylist, practical nurse, child care worker, waiter, domestic, janitor
- **TECHNICAL** such as computer programmer, medical or dental technician, draftsperson
- **TRADESPERSON** such as baker, auto mechanic, house painter, plumber, phone/cable installer, carpenter
- **WILL NOT BE WORKING FOR PAY**
- **FULL-TIME HOME MAKER**
- **OTHER (describe)** ______________________________

Is this career goal related to the focus of your high school program ? • Yes • No • Don't Know

Do you think that you will LIVE in the City when you are 30 years old? • Yes • No • Don't Know

Do you think that you will WORK in the City when you are 30 years old? • Yes • No • Don't Know

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We would now like to ask you some questions about your job training since you left high school.

Since leaving high school, have you participated in any training program such as on-the-job training, vocational/technical/trade programs, registered apprenticeships, government training programs, personal enrichment or correspondence courses? Do not include college programs.

• Yes • No

If yes, have you ever used this training on a job? • Yes • No

Do you hold any licenses or certificates that might help in employment? For example, a certificate in automotive mechanics or a licensed practical nurse.

• Yes • No

This next section will ask you for information about employment, jobs you have held and your search for work. The first several questions are designed to ask information about your activities ***last week.***

What were you doing *most* of *last week*? (circle only one)

- Working
- Looking for work
- Other ______________________(specify)
- With a job but not at work
- Unable to work
- Going to school
- Keeping house

Did you do any work for pay at all *last week*, not counting work around the house? • Yes • No

How many hours did you work for pay last week? ____________

If this was less than 35 hours, what was the *main* reason that you worked less than 35 hours?

- choice, did not want full-time work
- new job started or job terminated during week
- could find only part-time work
- own illness or illness of other family member
- too busy with housework, personal business, etc.
- slack work, material shortage, plant or machine repair
- holiday—legal or religious, or vacation
- labor dispute
- attends school
- Other ______________________(specify)

The following questions should be answered only if you were looking for work last week.

In what occupation are you looking for work? (For example: sales, police) ______________________

Is this occupation related to the focus of your high school program? • Yes • No

How long have you been looking for work? •Less than 1 month •1-3 months • 4-6 months • over 6 months

The next set of questions asks about jobs, employment, and job search since you left high school.

Since you left high school, how many different jobs have you held? ____________
(Please include full-time jobs, part-time jobs, apprenticeships, and military service, etc.)

Since you left high school, how much of the time have you been out of work AND looking for work?

- 0 %
- Less than 10%
- Between 10 and 25%
- Between 25 and 50%
- Over half

Now think back to the ***first job*** *that you held after you left high school. Please answer the following questions about that job.*

What kind of job or occupation did you have? ______________________________

What kind of business or industry was that job? ______________________________
(e.g., retail store, restaurant, assembly plant)

What month and year did you start this job? ___________(Month) ______________(Year)

What month and year did you leave/stop this job? ________(Month) ___________(Year) ______(Did not stop)

Was this job in _____? • Yes • No

About how many hours per week did you usually work in this job? ______________

What was your gross pay when you left (or current pay if still there)? _______ per ________ (e.g., $4.25 per hour)

Was this work related to the focus of your high school program? • Yes • No

Did you get this job directly as a result of contacts that you made through high school? • Yes • No

How valuable was your high school program in preparing you for this job?

- Very valuable
- Somewhat valuable
- Not valuable

In general, how satisfied were you with this job?

- Very satisfied
- Satisfied
- Dissatisfied
- Very dissatisfied

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***Please** answer the following set of questions about your **current job**. If you are not working, please answer these questions about your last job. **If this job is the same one described above, please proceed to the next page**.*

What kind of job or occupation do you have? ______________________________

What kind of business or industry is the job in? ______________________________
(e.g., retail store, restaurant, assembly plant)

What month and year did you start this job? __________(Month) _____________(Year)

What month and year did you leave/stop this job? _______(Month) _________(Year) _____(Did not stop)

Is this job in _____? • Yes • No

About how many hours per week do you usually work in this job? _____________

What is your gross pay? __________ per _______ (e.g., $4.25 per hour)

Is this work related to the focus of your high school program? • Yes • No

Did you get this job directly as a result of contacts that you made through high school? • Yes • No

How valuable was your high school program in preparing you for this job?

• Very valuable • Somewhat valuable • Not valuable

In general, how satisfied are you with this job?

• Very satisfied • Satisfied • Dissatisfied • Very dissatisfied

Finally, we would like to ask you some questions about yourself and your family background. First, think back to when you were 14 years old.

Who were the adult FEMALES that were living with you when you were 14? (Circle all that apply)

- Mother
- Step-mother
- Some other adult woman relative
- Some other adult woman
- No adult female present in the household

What was the highest grade in school that was completed by the adult FEMALE with whom you lived at age 14? If you lived with more than one adult female, please answer for the one that had the greatest impact on your life.

- Less than 9th Grade
- Some High School
- High School Graduate
- Some College
- Two-Year College Degree
- College Graduate
- Post Baccalaureate Degree (e.g., a Master's Degree)
- Don't know

Who were the adult MALES that were living with you when you were 14? (Circle all that apply)

- Father
- Step-father
- Some other adult male relative
- Some other adult male
- No adult male present in the household

What was the highest grade in school that was completed by the adult MALE with whom you lived at age 14? If you lived with more than one adult male, please answer for the one that had the greatest impact on your life.

- Less than 9th Grade
- Some High School
- High School Graduate
- Some College
- Two-Year College Degree
- College Graduate
- Post Baccalaureate Degree (e.g., a Master's Degree)
- Don't know

The following questions are about you and the people that ***currently*** *live with you.*

Is English the first language that you learned to speak when you were a child? • Yes • No

If English is *not* the first language that you learned, how would your rate your ability to use English:

- Very Good
- Good
- Not Good
- Not at all

What is your race?

- Mexican
- African American
- Other Asian or Pacific Islander
- Latino
- Chinese
- Native American
- NonHispanic White
- Japanese
- Other

When were you born? _____________(Month) ___________(Year)

What is your gender? • Male • Female

What is your current marital status?

- Divorced, Widowed, Separated
- Living in a Domestic Partnership
- Married
- Never Married

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Who are the people currently residing in your household? Please circle all people in the household and indicate number where appropriate.

- Husband, wife or partner
- Father or other male guardian (such as stepfather)
- Brother(s), including step or half brothers ________________(number)
- Sister(s), including step or half sisters ________________(number)
- Other relative(s), including children and adults ________________(number)
- Nonrelative(s), including children and adults ________________(number)
- Children or step-children ________________(number)
- Mother or other female guardian (such as stepmother)

Please answer the following section only if you have children.

What is the date of birth of your first (oldest) child? ________(Month) ___________(Year)

If this child lives with you, who cares for the child while you are at work or school?

- The child's other parent
- A day care center or preschool
- A relative, friend, neighbor or babysitter
- I do not go to work or school

If you also have another child, please answer the following questions about that child (or for your youngest child if you have more than one other child)

What is the date of birth of your youngest child? ________(Month) ___________(Year)

If this child lives with you, who cares for the child while you are at work or school?

- The child's other parent
- A day care center or preschool
- A relative, friend, neighbor or babysitter
- Do not go to work or school

Please answer the following section only if you are currently married or in a domestic partnership.

What is the highest level of education that your spouse/partner has completed?

- Less than 9th Grade
- Some High School
- High School Graduate
- Some College
- Two-Year College Degree
- College Graduate
- Post Baccalaureate Degree
- Don't Know

Did your spouse/partner hold a job last week? • Yes • No

(a) If yes, how many hours did he or she work? ____________________

(b) How does this compare to the usual hours that he or she usually works?

- About the Same
- Less than Usual
- More than Usual

*** * END OF SURVEY * ***

THANK YOU FOR COMPLETING THIS SURVEY. YOUR ANSWERS WILL HELP IMPROVE HIGH SCHOOL PROGRAMS FOR FUTURE STUDENTS.

PLEASE RETURN THIS SURVEY NOW IN THE ENVELOPE PROVIDED.

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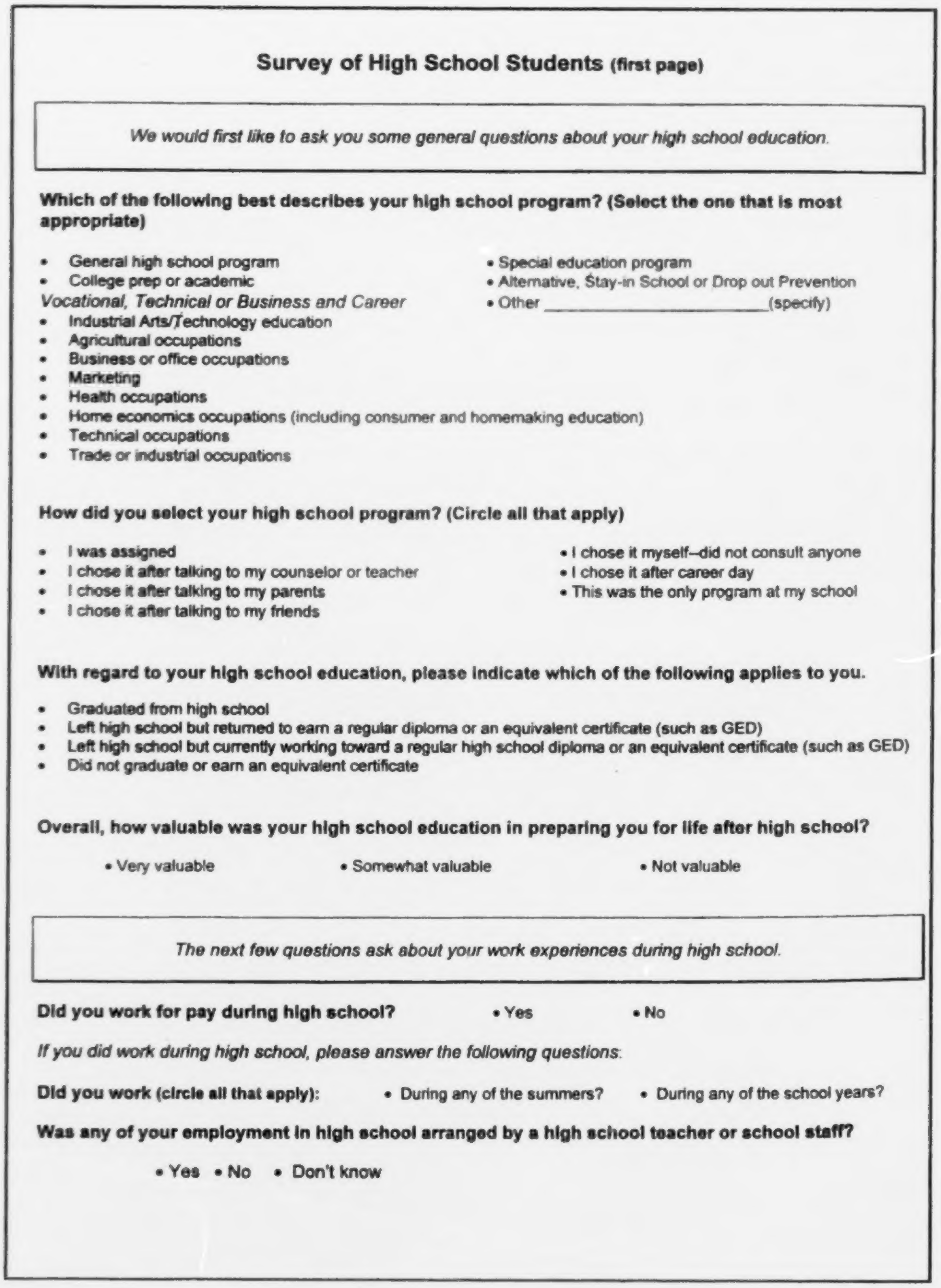

Survey of High School Students (first page)

We would first like to ask you some general questions about your high school education.

Which of the following best describes your high school program? (Select the one that is most appropriate)

- General high school program
- College prep or academic

Vocational, Technical or Business and Career

- Industrial Arts/Technology education
- Agricultural occupations
- Business or office occupations
- Marketing
- Health occupations
- Home economics occupations (including consumer and homemaking education)
- Technical occupations
- Trade or industrial occupations
- Special education program
- Alternative, Stay-in School or Drop out Prevention
- Other ________________________(specify)

How did you select your high school program? (Circle all that apply)

- I was assigned
- I chose it after talking to my counselor or teacher
- I chose it after talking to my parents
- I chose it after talking to my friends
- I chose it myself--did not consult anyone
- I chose it after career day
- This was the only program at my school

With regard to your high school education, please indicate which of the following applies to you.

- Graduated from high school
- Left high school but returned to earn a regular diploma or an equivalent certificate (such as GED)
- Left high school but currently working toward a regular high school diploma or an equivalent certificate (such as GED)
- Did not graduate or earn an equivalent certificate

Overall, how valuable was your high school education in preparing you for life after high school?

- Very valuable
- Somewhat valuable
- Not valuable

The next few questions ask about your work experiences during high school.

Did you work for pay during high school? • Yes • No

If you did work during high school, please answer the following questions.

Did you work (circle all that apply): • During any of the summers? • During any of the school years?

Was any of your employment in high school arranged by a high school teacher or school staff?

• Yes • No • Don't know

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Survey of HS6 Students (first page)

We would first like to ask you some general questions about your high school education

Which of the following best describes your high school program? (Select the one that is most appropriate)

- General high school program
- College prep or academic

Vocational, Technical or Business

- Industrial Arts/Technology education
- Agricultural occupations
- Business or office occupations
- Marketing
- Health occupations
- Home economics occupations (including consumer and homemaking education)
- Technical occupations
- Trade or industrial occupations

Career Academy

- Future Teacher Academy
- Performing Arts

- Special education program
- Alternative, Stay-in School or Drop out Prevention
- Other ______________________(specify)

How did you select your high school program? (Circle all that apply)

- I was assigned
- I chose it after talking to my counselor or teacher
- I chose it after talking to my parents
- I chose it after talking to my friends
- I chose it myself–did not consult anyone
- I chose it after career day
- This was the only program at my school

With regard to your high school education, please indicate which of the following applies to you.

- Graduated from high school
- Left high school but returned to earn a regular diploma or an equivalent certificate (such as GED)
- Left high school but currently working toward a regular high school diploma or an equivalent certificate (such as GED)
- Did not graduate or earn an equivalent certificate

Overall, how valuable was your high school education in preparing you for life after high school?

- Very valuable
- Somewhat valuable
- Not valuable

The next few questions ask about your work experiences during high school.

Did you work for pay during high school? • Yes • No

If you did work during high school, please answer the following questions:

Did you work (circle all that apply): • During any of the summers? • During any of the school years?

Was any of your employment in high school arranged by a high school teacher or school staff?

- Yes
- No
- Don't know

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